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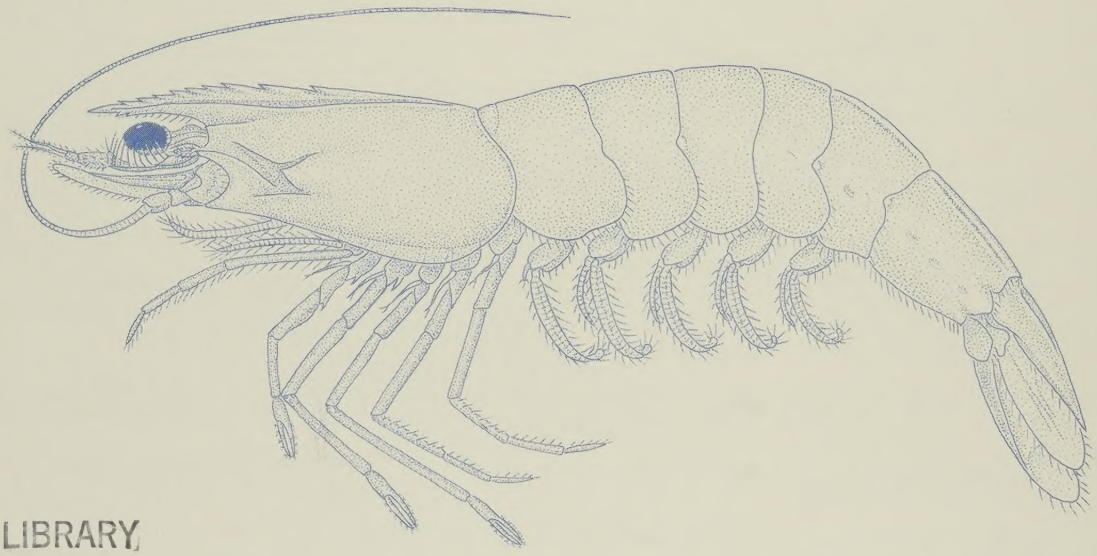
NOAA Technical Report NMFS 64

April 1988

Illustrated Key to Penaeoid Shrimps of Commerce in the Americas

Isabel Pérez Farfante



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Isabel Pérez Farfante

April 1988

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Illustrated Key to Penaeoid Shrimps of Commerce in the Americas

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ABSTRACT

The commercially important species of penaeoid shrimps comprise 4 families, 12 genera, and 37 species in the Americas. This key is supported by 49 figures including lateral views of whole shrimps in 10 of the 12 genera and detailed figures of male (petasma) and female (thelycum) genital structures of the species. A glossary of terms used in shrimp taxonomy plus a bibliography of references useful in identifying shrimps are included.

Introduction

The American commercial penaeoids, consisting of 37 species of shrimps, constitute the most valuable segment of the U.S. fishing industry. In 1986, total domestic commercial landings of all shrimps (including carideans) amounted to 244.4 million pounds (heads-off weight) with an ex-vessel value of $662.7 million (Thompson 1987). The penaeoid contribution to these figures was about 205.8 million pounds, valued at $622.6 million. An additional 238.0 million pounds of penaeoids (heads-off) worth $944.3 million (FOB) were imported from other American countries, bringing the combined value of penaeoids to about $1.57 billion.

Penaeoids are fished from North Carolina to Argentina in the western Atlantic and from California to northern Peru in the eastern Pacific. Most species are harvested at depths of less than 70 m. Only four western Atlantic and two eastern Pacific species are taken at depths greater than 70 m; three of the western Atlantic species, however, are fished irregularly.

Because of their economic value and abundance in estuarine and littoral ecosystems, these shrimps are widely studied, and the literature treating them is extensive. Correct identifications of the species are essential as a background for basic biological research, ecological investigations, studies involving population dynamics, fisheries impact, and statistical analyses of landings and imports. Taxonomic revisions and extensions of fisheries to new grounds have reduced the utility of most of the existing keys, and some of the more comprehensive keys (restricted unfortunately, to biologists trained in shrimp taxonomy) do not include definitions or illustrations of diagnostic characters. The illustrated keys provided herein are based on features which should facilitate determination of species by a wide variety of users.

In the keys, the scientific name of each species is followed by vernacular names, the maximum length attained by members of each sex, and geographic and bathymetric ranges. Appended to the keys are a glossary and a list of references for readers interested in more in-depth study of the systematics of penaeoids. Characters used in the keys are depicted in Figures 1-5.

Shrimps are crustaceans belonging to the Order Decapoda, as are lobsters, crayfishes, crabs, and hermit crabs. They have a firm integument and a body consisting of two regions: the cephalothorax and the abdomen. In many, the carapace is produced anteriorly into a rostrum and characteristically bears the following appendages: antennules (first pair of feelers), antennae (second pair of feelers), mouthparts (consisting of mandibles, two pairs of maxillae, and three pairs of maxillipeds), and five pairs of pereopods (legs). Basically, the abdomen consists of six segments: segments 1-5 usually bear a pair of swimming appendages (pleopods or swimmerets), and the sixth segment bears the uropods (broad appendages) often forming, with the median tail piece or telson, a tail fan.

The shrimps constitute a large group, about 2,500 species, that exhibit great diversity in size, ranging in length from a few to about 350 mm. The body of shrimps is commonly laterally compressed, the rostrum is usually armed with teeth, and the abdomen is longer than the carapace. The antennules bear a small scale or spine at the base (the stylocerite), and the antennae bear a large, platelike scale (the scaphocerite). The pereopods are usually slender, but in some species a single or pair of pereopods may be robust. The pleopods are well developed and, except in a relatively small number of species, are present on all five anterior abdominal segments.

Shrimps, in general, are widely distributed, occurring in marine, estuarine, and fresh waters, from the Equator to the polar regions.

Most marine species occupy shallow or moderately deep waters, but some are found at depths of almost 5,700 m; the majority of commercial species are taken on continental or island shelves at depths of less than 100 m, but a few are caught at depths as great as 800 m. Although many shrimps are pelagic, most are benthic, living on a large variety of bottoms including mud, peat, sand, rock, fragments of shells, or mixtures of these materials. Also, some dwell on coral reefs, among sponges, or are associated with other invertebrates.

Among most shrimps, as in the other decapods, the sexes are separate, but certain species first undergo a male phase and are later transformed into females. The gonopores open usually on the proximal article of the third pair of pereopods in females and on the fifth in males; however, in males of certain groups of species they open on the adjacent sternite.

There are several major groups of shrimps, the relationships of which are still uncertain. Penaeoid and sergestoid shrimps constitute the Infraorder Penaeidea. They are characterized by the first three pairs of pereopods being chelate (ending in pincers) and of similar size and shape, the pleura of the second abdominal segment overlapping the third but not the first, and the gills dendobranchiate. Males bear a supposedly copulatory structure, the petasma, consisting of the enlarged and interlocked endopods of the first pair of pleopods. The genital apparatus of females, situated on the last two thoracic sternites, consists of a thelycum, which is composed of either protuberances and depressions or of single or paired plates covering single or paired seminal receptacles for the reception or enclosure of spermatophores. Females release eggs directly into the water (instead of carrying them on the pleopods), and the eggs hatch as nauplii.

Sergestoids can be separated from the penaeoids by the lack or reduction in size of the fourth and fifth pairs of pereopods and by having a smaller number of gills.

A second major group of shrimps, the stenopodoids, form the Infraorder Stenopodidea, which are of no commercial importance. They exhibit an arrangement of the abdominal pleura similar to that of the penaeoids and sergestoids, but differ by having the third of the first three pairs of chelate pereopods considerably elongate, and gills trichobranchiate. The first pair of pleopods in males lack endopods, and the females carry the eggs on the pleopods until they hatch as zoeae or at a later developmental stage.

The carideans consistute a third major group of shrimps, consisting of about 10 superfamilies comprising the Infraorder Caridea, many members of which are of major economic importance. They are characterized by the third pair of pereopods never being chelate, by the pleura of the second abdominal segment overlapping those of both the first and third segments, and gills phyllobranchiate. Males lack a petasma but usually possess appendices internae on all pleopods; females carry the eggs on the pleopods until they hatch as zoeae or at a later developmental stage. These shrimps constitute the basis of a large number of fisheries in temperate waters, but are of decidely less economic importance in the western Atlantic and eastern Pacific than are the penaeoids.

Many penaeoids other than the species treated herein may occur in the commercial catches; however, because of small size, soft body, or scarcity, they are of little or no economic value. Identification of many of these shrimps may be aided by the references section.

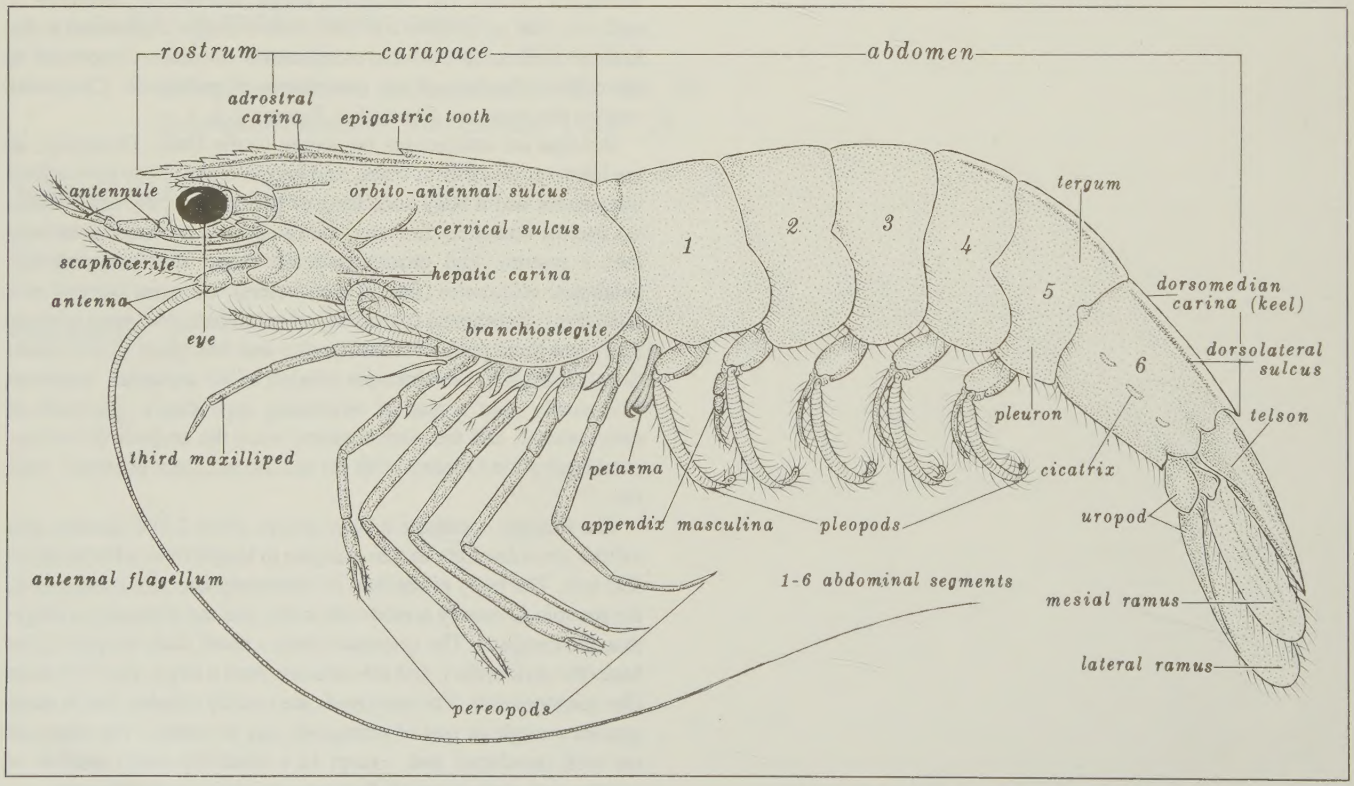

Figure 1

Lateral view of generalized penaeoid shrimp showing structures and terms used in keys.

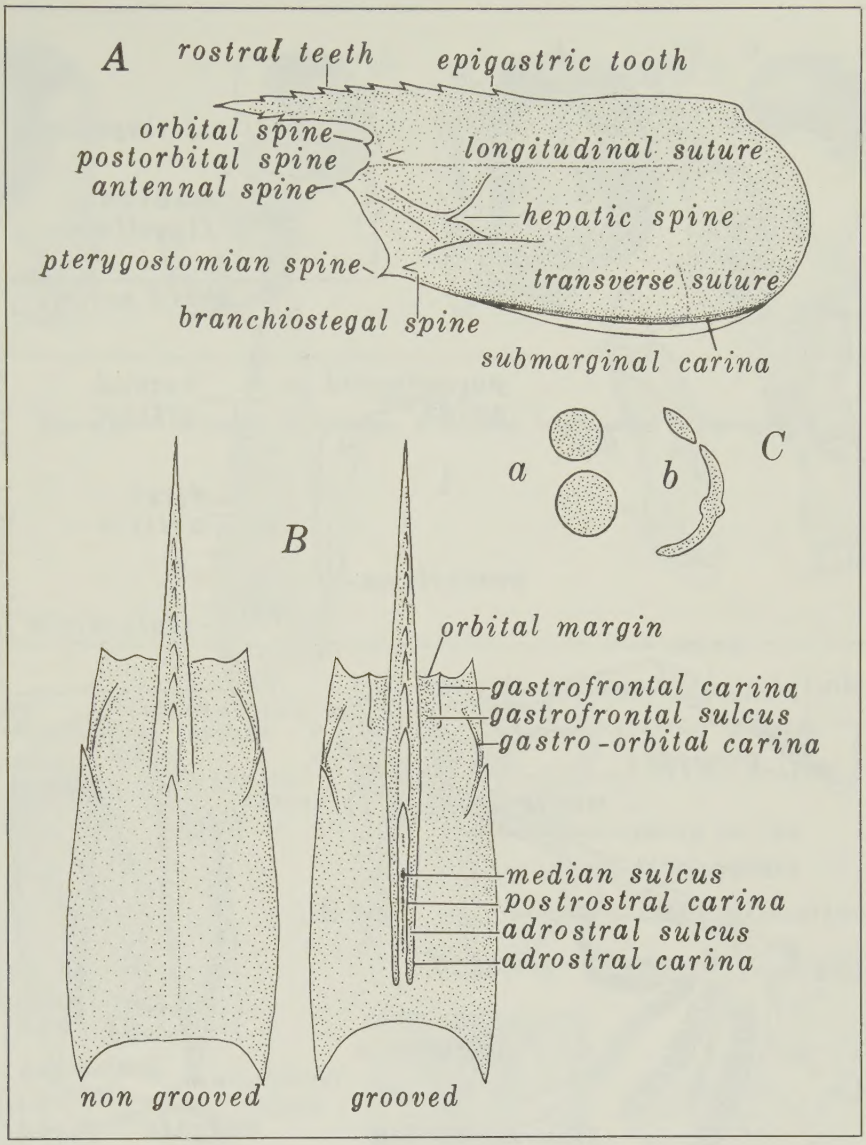

Figure 2

Characters used in keys to penaeoids. A. Lateral view of carapace. B. Type of carapaces, dorsal view. C. Cross section of antennular flagella: a. filiform; b. flattened.

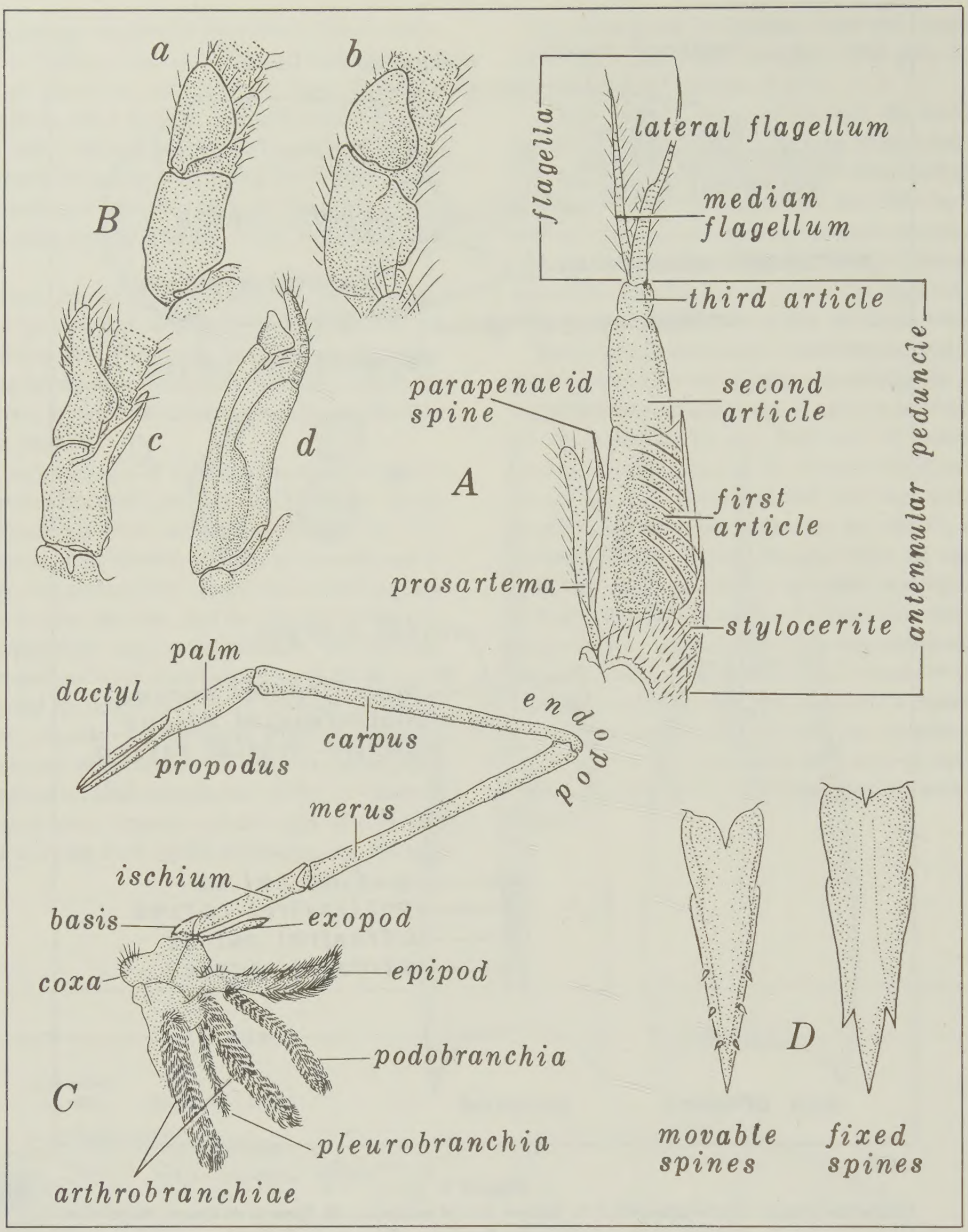

Figure 3

Characters used in keys to penaeoids. A. Antennule. B. Types of appendices masculinae in penaeoid families: a. Aristeidae; b. Penaeidae; c. Solenoceridae; d. Sicyoniidae. C. Pereopod with branchiae. D. Types of telsons.

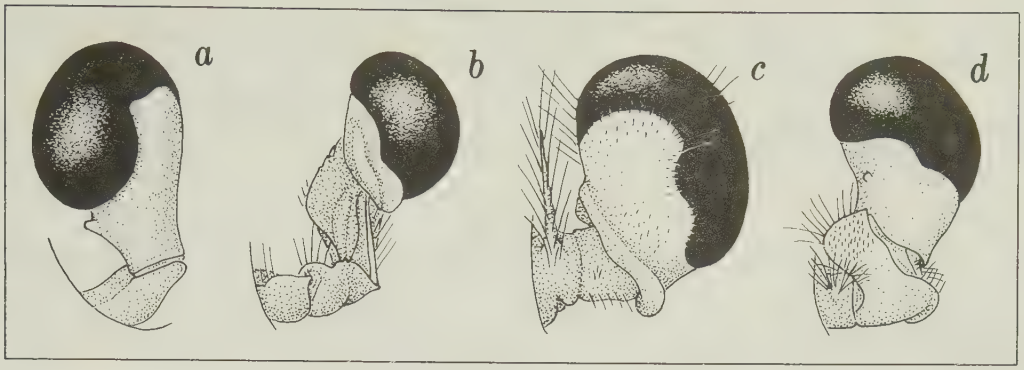

Figure 4

Types of eyes in the families: a. Aristeidae; b. Penaeidae; c. Sicyoniidae; d. Solenoceridae.

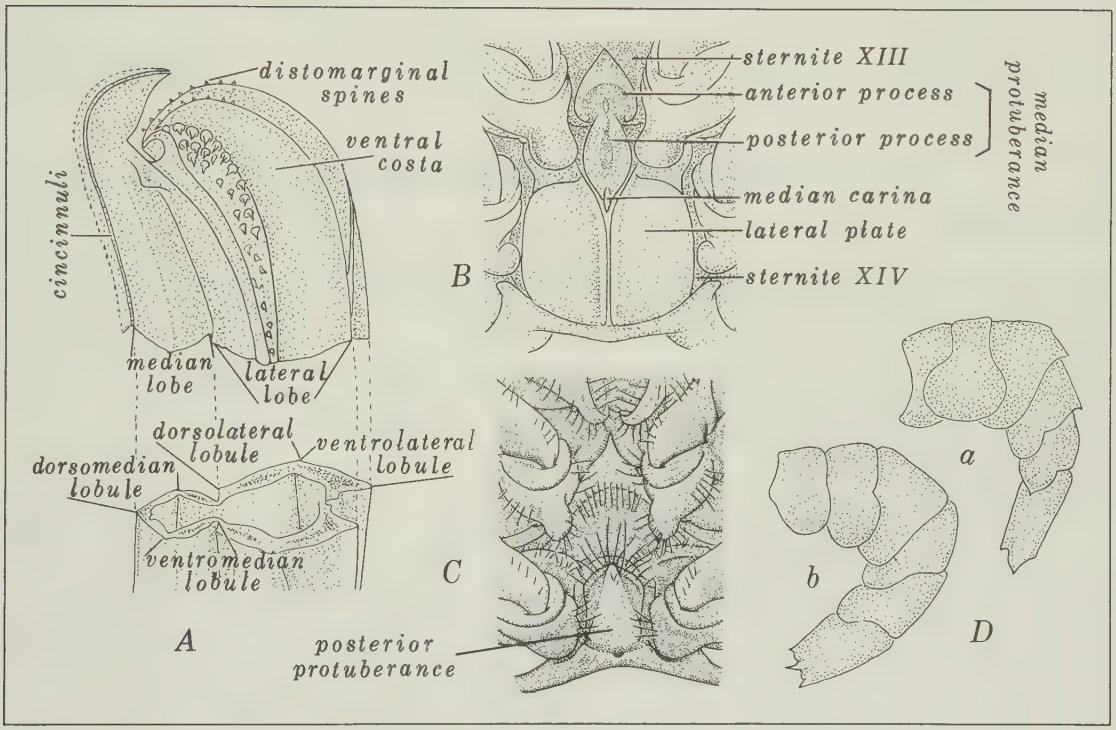

Figure 5

Terms applied to: A. Petasma; B,C. Thelyca. D. Types of abdomen in: a. Caridea; b. Penaeidea.

Superfamily PENAEOIDEA

Key to commercially important families

1a. Postorbital spine present. Both antennular flagella flattened in one of three genera of family treated here. Basis of second pair of pleopods produced into distolateral projection ..... **Solenoceridae**
(Species not fished commercially in the western Atlantic).

1b. Postorbital spine absent. Both antennular flagella filiform. Basis of second pair of pleopods not produced distolaterally 2

2a. Integument rigid, stony in appearance. First antennular article with vestigial prosartema. Posterior three pairs of pleopods uniramous, with exopod only ..... **Sicyoniidae**

2b. Integument rather flexible. First antennular article with well developed prosartema. Posterior three pairs of pleopods biramous, with endopod and exopod 3

3a. Dorsal and ventral flagella inserted at distal margin of third article of antennular peduncle. Males with second pair of pleopods bearing appendix masculina at base of endopod, lacking appendix interna. Penultimate thoracic segment with 1 well developed arthrobranchia or, if with 2, anteroventral one rudimentary ..... **Penaeidae**

3b. Dorsal flagellum inserted at about proximal half of third article of antennular peduncle. Males with second pair of pleopods bearing appendix masculina and appendix interna at base of endopod. Penultimate thoracic segment with 2 well developed arthrobranchiae ..... **Aristeidae**
(Species not fished commercially in the eastern Pacific).

Family ARISTEIDAE Wood-Mason, 1891

Key to genera and species

1a. Body setose. Rostrum with many dorsal teeth. Hepatic spine present. Petasma with dorsolateral lobule considerably overreaching ventromedian lobule. Thelycum with posterior protuberance on sternite XIV short, rounded, and relatively thin and clearly free anteriorly ..... ***Aristaeomorpha foliacea* (Risso, 1827)**
Red gamba prawn, giant red shrimp. Gamba roja, chorizo. Fig. 6.

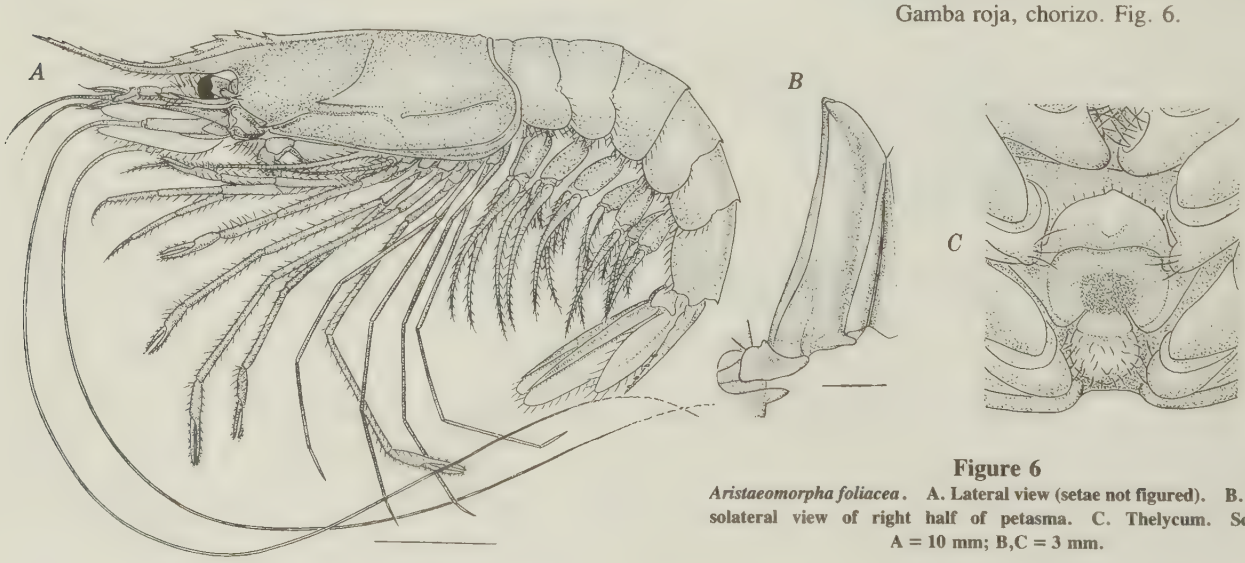

Figure 6
***Aristaeomorpha foliacea*. A. Lateral view (setae not figured). B. Dorsolateral view of right half of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 3 mm.**

Maximum total length: males, 170 mm; females, 225 mm. Western Atlantic: south of Massachusetts to the Straits of Florida, throughout the Gulf of Mexico and Caribbean Sea to off the Atlantic coast of Venezuela. Eastern Atlantic: Bay of Biscay to Bahía de Río de Oro, Africa, and Mediterranean Sea. Indo-West Pacific: off east Africa, Madagascar, Maldives, Indonesia, Australia, New Zealand, New Caledonia, Fiji, and Japan (records from the Pacific perhaps pertain to a different species). Depth 170-175 to 1300 m.

1b. Body polished. Rostrum with 3 dorsal teeth. Hepatic spine lacking. Petasma with dorsolateral lobule extending as far as or only slightly overreaching ventromedian lobule. Thelycum lacking posterior protuberance on sternite XIV or, if present, elongate, subelliptical and almost completely fused 2

2a. Cervical sulcus shallow and short, not nearly reaching dorsomedian line. Gastro-orbital carina lacking. Third pair of pereopods lacking podobranchia. Petasma with ventral costa falling conspicuously short of terminal margin of ventrolateral lobule, its distal extremity not produced in apical hook. Thelycum lacking posterior protuberance on sternite XIV ..... ***Aristeus antillensis* A. Milne Edwards and Bouvier, 1909**
Purple-headed gamba prawn. Gamba violeta. Fig. 7.

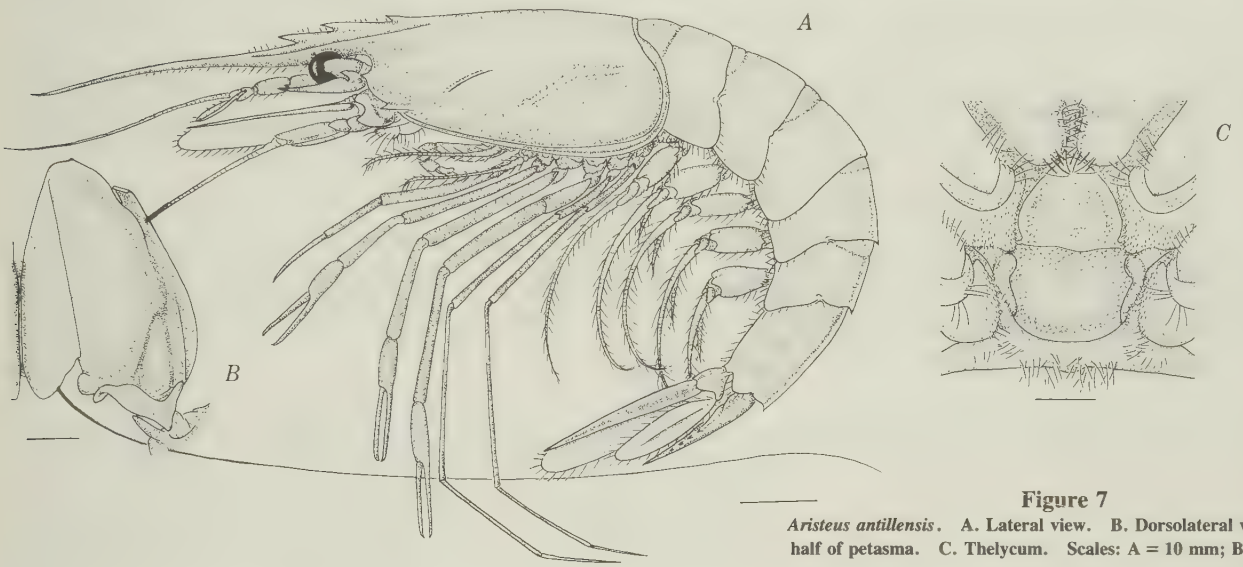

Figure 7
***Aristeus antillensis*. A. Lateral view. B. Dorsolateral view of right half of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 2 mm.**

Maximum total length: males, 112 mm; females, 193 mm. Off Cape Henlopen, Delaware (38°43′N), through the Gulf of Mexico and Caribbean Sea, and southward to French Guiana[1]. Depth 200-750 m, occasionally as much as 1100 m.

[1]Material examined during the preparation of this study revealed that the geographic range of this species, as well as that of *Trachypenaeus constrictus, T. faoe, T. pacificus, Solenocera agassizii,* and *S. florea,* extends beyond the previously known limits.

2b. Cervical sulcus deep and long, almost reaching dorsomedian line. Gastro-orbital carina strong and sharp. Third pair of pereopods with well developed podobranchia. Petasma with ventral costa extending to distal margin of dorsolateral lobule, there produced in apical hook. Thelycum with strong posterior protuberance on sternite XIV ..... ***Plesiopenaeus edwardsianus* (Johnson, 1868)**
Scarlet gamba prawn. Gamba carabinero, langostino moruno. Fig. 8.

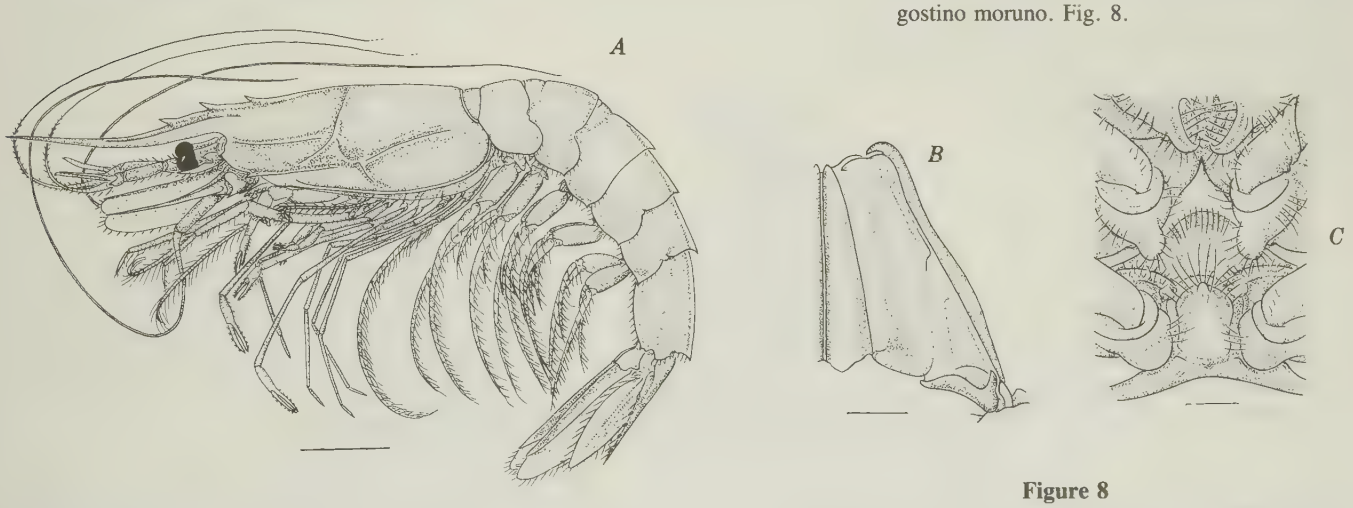

Figure 8
***Plesiopenaeus edwardsianus*. A. Lateral view. B. Dorsolateral view of right half of petasma. C. Thelycum. Scales A = 20 mm; B,C = 2 mm.**

Maximum total length: males, 193 mm; females, 334 mm. Western Atlantic: Grand Bank (43°42′) south through the Gulf of Mexico and Caribbean Sea to French Guiana. Eastern Atlantic: Portugal including Azores and Madeira Is., to South Africa (absent from the Mediterranean Sea). Indo-West Pacific: off east Africa to Australia and Japan (records from this region might belong to a different species). Depth 200-1850 m.

Family PENAEIDAE Rafinesque, 1815

Key to genera

1a. Rostrum with dorsal and ventral teeth. Last thoracic segment with gills (pleurobranchiae) ..... ***Penaeus***

1b. Rostrum with dorsal teeth only. Last thoracic segment lacking gills 2

2a. Telson with pair of well developed, fixed, posterolateral spines and usually 2 pairs of more anterior movable spines. Ventromesial margin of first antennular article bearing spine (parapenaeid spine) ..... ***Artemesia***
(Western Atlantic)

2b. Telson with or without posterolateral spines, if present, small and movable. Ventromesial margin of first antennular article lacking spine 3

3a. First 3 pairs of pereopods with palm of chelae very elongate, more than 3 times as long as dactyl. Petasma produced distally in pair of lateral horns, their apices forming slender hooks. Thelycum with anterior margin of plate of sternite XIV V-shaped ..... ***Protrachypene***
(Eastern Pacific)

3b. First 3 pairs of pereopods with palm of chelae not elongate. Petasma produced distally in pair of lateral horns, their apices not hooklike. Thelycum with anterior margin of plate(s) of sternite XIV convex or straight and narrowly and deeply cleft 4

4a. Carapace with longitudinal suture but lacking transverse suture (at least in adults). Fourth and fifth pairs of pereopods with elongate dactyl subdivided into articles ..... ***Xiphopenaeus***

4b. Carapace with longitudinal and transverse sutures. Fourth and fifth pair of pereopods with dactyl neither elongate nor subdivided into articles ..... ***Trachypenaeus***

Genus *Artemesia* Bate, 1888

Western Atlantic

Only one species in the genus ..... ***Artemesia longinaris* Bate, 1888**
Argentine stiletto shrimp. Camarón. Camarão argentino, camarão serrinha, camarão ferrinho, camarão barba brancha. Fig. 9.

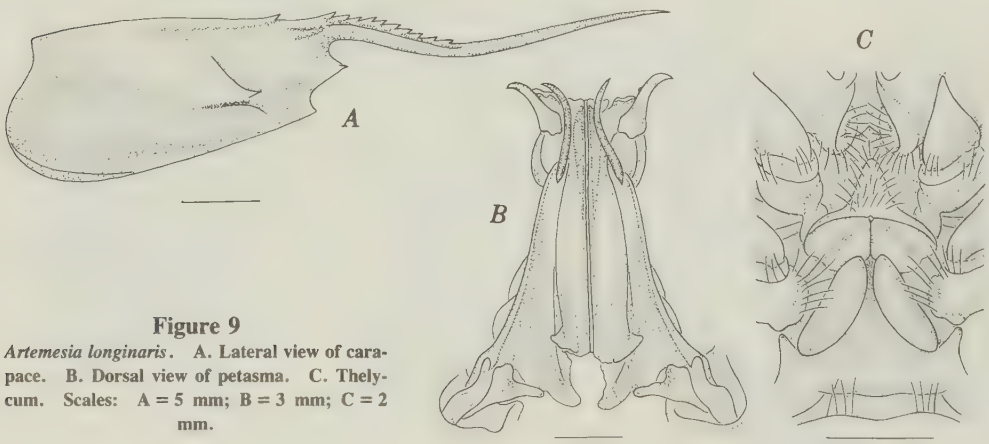

Figure 9
***Artemesia longinaris*. A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 5 mm; B = 3 mm; C = 2 mm.**

Rostrum long, styliform, sinuous, and bearing 7 to 14 basally situated teeth in advance of epigastric tooth. Fourth and fifth pairs of pereopods very long and flagelliform. Petasma with distal part of dorsolateral lobule heavily sclerotized, produced distally in strong, laterally curved projection, and at about 0.75 mm length bearing long, slender, sinuous horn mesially. Thelycum with pair of elongate, posteriorly divergent prominences on sternite XIV; pair of contiguous plates deflected anteriorly, and abutting subtriangular, median protuberance on sternite XIII.

Maximum total length: males, 106 mm; females, 145, rarely as much as 152 mm. Rio de Janeiro, Brazil, to Rawson (43°15′S), Argentina. Littoral to 68 m.

Key to Western Atlantic species

1a. Adrostral sulcus and adrostral carina short, ending at level of or only slightly posterior to epigastric tooth. Gastrofrontal carina absent. Petasma lacking distomedian projections. Thelycum of "open type," lacking plates and seminal receptacle on sternite XIV. (Subgenus ***Litopenaeus***, "non-grooved species") 2

1b. Adrostral sulcus and adrostral carina long, conspicuously surpassing epigastric tooth, often reaching almost to posterior margin of carapace. Gastrofrontal carina present. Petasma with well developed distomedian projections. Thelycum of "closed type," possessing lateral plates meeting in midline and seminal receptacle on sternite XIV. (Subgenus ***Farfantepenaeus***, "grooved species") 3

2a. Petasma with inner surface of distal part of lateral lobe smooth, lacking diagonal ridge, and with submedian inner lapel bearing deep distal emargination. Thelycum with pair of subparallel anterolateral ridges followed posteriorly by pair of rather widely separated rounded protuberances on sternite XIV ..... ***Penaeus (Litopenaeus) schmitti* Burkenroad, 1938**
White shrimp, southern white shrimp. Camarón blanco, langostino blanco. Camarão legítimo, camarão verdadeiro, camarão branco. Fig. 10.

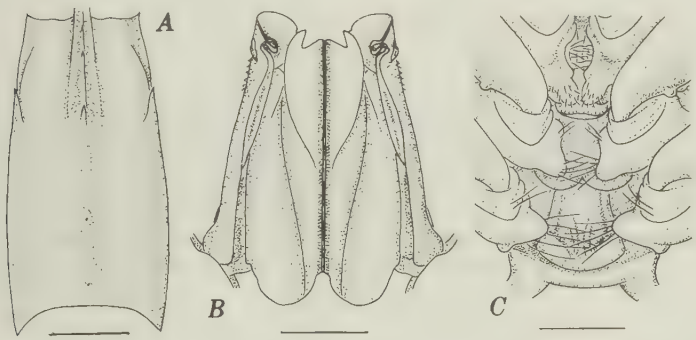

Figure 10
***Penaeus (Litopenaeus) schmitti*. A. Dorsal view of carapace. B. Ventral view of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 3 mm.**

Maximum total length: males, 175 mm; females, 235 mm. Caribbean Sea, from Cuba to Guadeloupe and from Belize to Venezuela, and along the Atlantic coast of South America to Laguna, Brazil. Estuarine and marine to 47 m.

2b. Petasma with inner surface of distal part of lateral lobe bearing diagonal ridge and with submedian inner lapel bearing shallow distal emargination. Thelycum with pair of sharp, anterolateral ridges converging posteriorly and pair of closely set posterior lobes on sternite XIV ..... ***Penaeus (Litopenaeus) setiferus* (Linnaeus, 1767)**
White shrimp, northern white shrimp. Camarón blanco. Figs. 11-12.

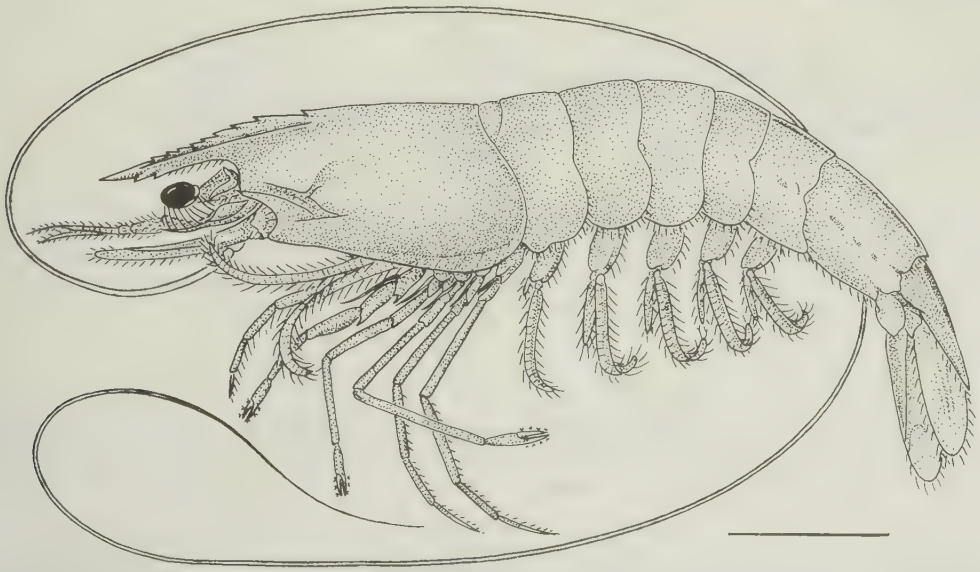

Figure 11
***Penaeus (Litopenaeus) setiferus*. Lateral view. Scale = 20 mm.**

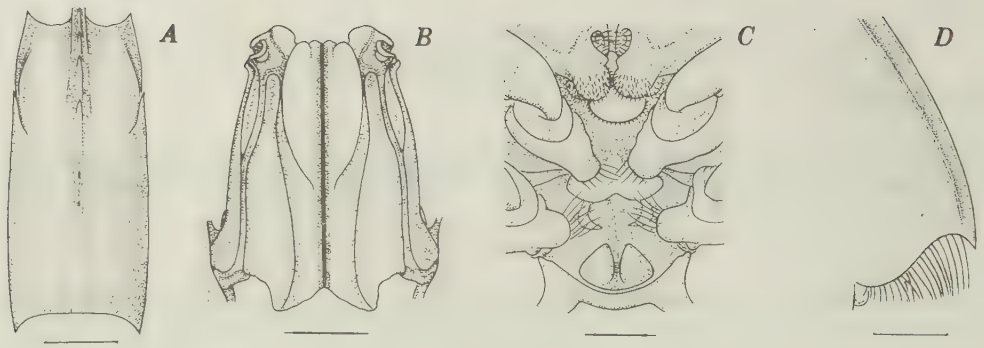

Figure 12

***Penaeus (Litopenaeus) setiferus*. A. Dorsal view of carapace. B. Ventral view of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B,C = 3 mm; D = 2 mm.**

Maximum total length: males, 175 mm; females, 257 mm. Fire Island, New York, to Saint Lucie Inlet, Florida. Gulf of Mexico: off Dry Tortugas Islands and Tampa Bay, and from Ochlockonee River, Florida, along the coast of USA and Mexico to Campeche. Estuarine and marine to 90 m.

3a. Petasma with distomedian projection long and distal fold forming large auricle (protruding considerably inward) bearing small spines; ventral costa with apex free from adjacent membranous part. Thelycum with anteromedian corners of lateral plates produced anteriorly forming two small projections covering posterior process; latter usually bearing deeply situated median carina posteriorly. Dark spot at juncture of third and fourth abdominal segments ..... ***Penaeus (Farfantepenaeus) brasiliensis* Latreille, 1817**
Pink spotted shrimp, red spotted shrimp. Camarón rosado con mancha; langostino rosado con mancha. Camarão rosa, camarão lixo. Fig. 13.

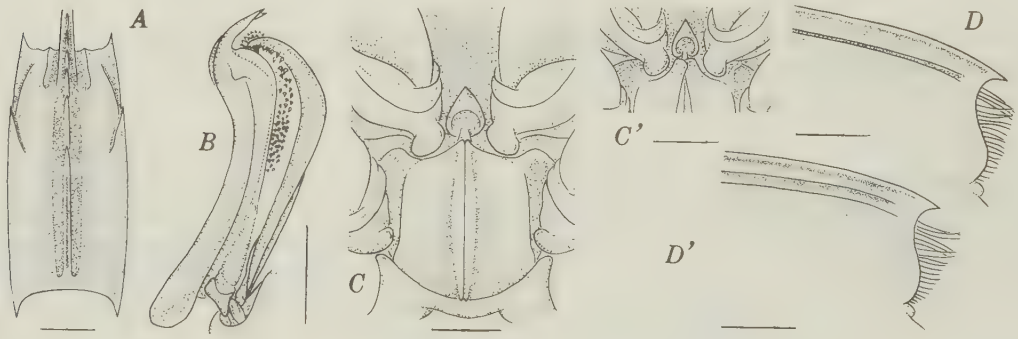

Figure 13

***Penaeus (Farfantepenaeus) brasiliensis*. A. Dorsal view of carapace. B. Lateral view of right half of petasma. C. Thelycum (from Little Bahama Bank). C′. Anterior part of thelycum (from Brazil). D. Posterodorsal part of sixth abdominal segment (from Saint Augustine, Florida). D′. Posterodorsal part of sixth abdominal segment (from Camocin, Brazil). Scales: A = 10 mm; B-D′ = 3 mm.**

Maximum total length: males, 191 mm; females, 250 mm. Off Cape Hatteras, North Carolina, and Bermudas to Florida Keys; in the Gulf of Mexico, known only from northeast of Marquesas Keys, Florida Bay, and From Bahía de Campeche to Cabo Catoche, Yucatán, Mexico. Also along the West Indies, Caribbean coast of Central and South America, and Atlantic coast of South America to Rio Grande, Rio Grande do Sul, Brazil. Estuarine and marine to 75 m, rarely to 366 m.

3b. Petasma with distomedian projection relatively short and distal fold not forming auricle; ventral costa with apex attached to adjacent membranous part. Thelycum with anteromedian corners of lateral plates not produced; posterior process exposed. Dark spot present or absent on abdomen at juncture of third and fourth abdominal segments 4

4a. Petasma with distal part of ventral costa bearing minute spines along free border and compact group of strong teeth on attached border. Lateral plates of thelycum with anteromedian corners slightly divergent; posterior process with undivided median carina 5

4b. Petasma with distal part of ventral costa unarmed along free border but bearing narrow patch of small teeth on attached border or irregular group of apical teeth. Lateral plates of thelycum with anteromedian corners widely divergent; posterior process with anteriorly bifurcate median carina 6

5a. Dorsolateral sulcus of sixth abdominal segment narrow, ratio of keel height to sulcus width (measured at about 1/3 of segment length from posterior margin) usually more than 3, sulcus sometimes virtually closed. Dark spot present at juncture of third and fourth abdominal segments ..... ***Penaeus (Farfantepenaeus) duorarum* Burkenroad, 1939**
Pink shrimp, northern pink shrimp, pink spotted shrimp. Camarón rosado. Fig. 14.

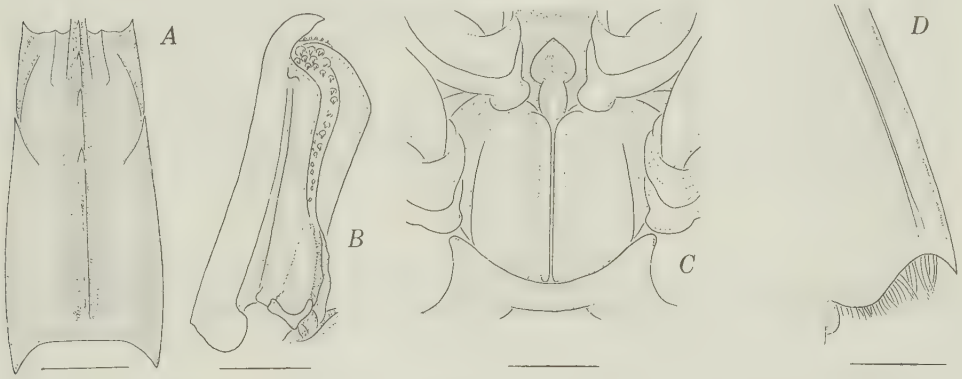

Figure 14
***Penaeus (Farfantepenaeus) duorarum*. A. Dorsal view of carapace. B. Lateral view of right half of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B-D = 3 mm.**

Maximum total length: males, 190 mm (occasionally as much as 269 mm); females, 280 mm. Lower Chesapeake Bay and Bermudas to Straits of Florida; in the Gulf of Mexico, from Dry Tortugas Islands along the coast of USA and Mexico to Cabo Catoche and south to Isla Mujeres. Estuarine and marine to 55 m, rarely to 277-375 m.

5b. Dorsolateral sulcus broad, ratio of keel height to sulcus width usually less than 3. Dark spot at juncture of third and fourth abdominal segments present in Caribbean populations but absent in South American populations ..... ***Penaeus (Farfantepenaeus) notialis* Pérez Farfante, 1967**
Pink shrimp, southern pink shrimp. Camarón acaramelado; in South America, camarón rojo sin mancha or langostino rosado sin mancha. Camarão rosa. Fig. 15.

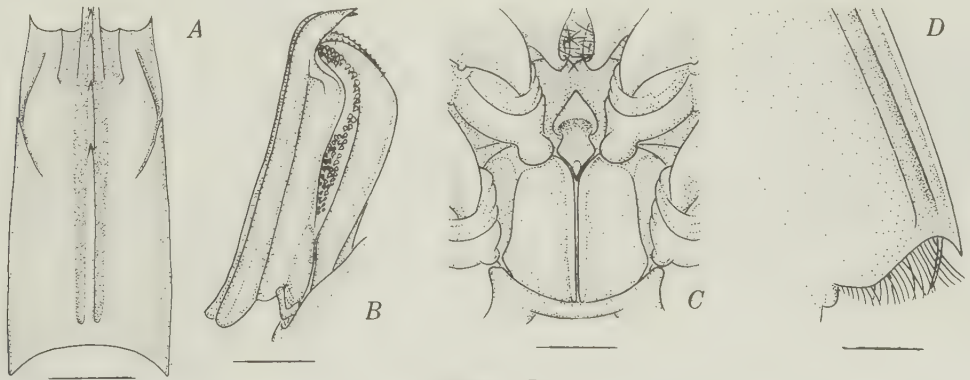

Figure 15
***Penaeus (Farfantepenaeus) notialis*. A. Dorsal view of carapace. B. Lateral view of right half of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B-D = 3 mm.**

Maximum total length: males, 175 mm; females, 200 mm. Western Atlantic: Cuba to Virgin Islands and from Bahía de la Ascensión, Quintana Roo, Mexico, along the Caribbean coast of Central and South America and the Atlantic coast of South America to Alagoas, Brazil. (Records from Ilheus to Cabo Frio need confirmation). Eastern Atlantic: west coast of Africa, from Mauritania to Angola. Estuarine to 100 m, rarely to 700 m.

6a. Adrostral sulcus relatively short, never approaching posterior margin of carapace, shallow and narrow posteriorly, where 1/5 to 3/4 times width of postrostral carina ..... ***Penaeus (Farfantepenaeus) subtilis* Pérez Farfante, 1967**
Dark shrimp, southern brown shrimp. Camarón café, camarón marrón, langostino amarillo. Camarão vermelho, camarão lixo. Fig. 16.

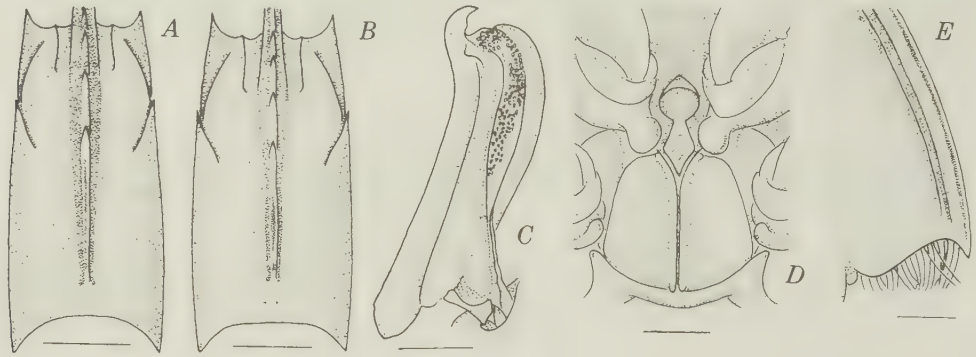

Figure 16
***Penaeus (Farfantepenaeus) subtilis*. A,B. Dorsal views of carapace. C. Lateral view of right half of petasma. D. Thelycum. E. Posterodorsal part of sixth abdominal segment. Scales: A,B = 10 mm; C-E = 2 mm.**

Maximum total length: males, 152 mm; females, 205 mm. Cuba through the Antilles and from Honduras along the Caribbean coast of Central and South America and the Atlantic coast of South America to Rio de Janeiro, Brazil. Estuarine and marine to about 90 m, rarely to 192 m.

6b. Adrostral sulcus long, almost reaching posterior margin of carapace, deep and broad posteriorly, where 4/5 to 2 times width of postrostral carina 7

7a. Median sulcus long and deep along entire length. Dorsolateral sulcus broad, ratio of keel height to sulcus width usually less than 3. Petasma with distal part of ventral costa tapering to point, arc-shaped, and armed with elongate patch of closely set small teeth on attached border. Thelycum with anterior and posterior processes relatively broad ..... ***Penaeus (Farfantepenaeus) aztecus* Ives, 1891**
Brown shrimp, northern brown shrimp. Camarón café, camarón café norteño, camarón moreno. Figs. 17-18.

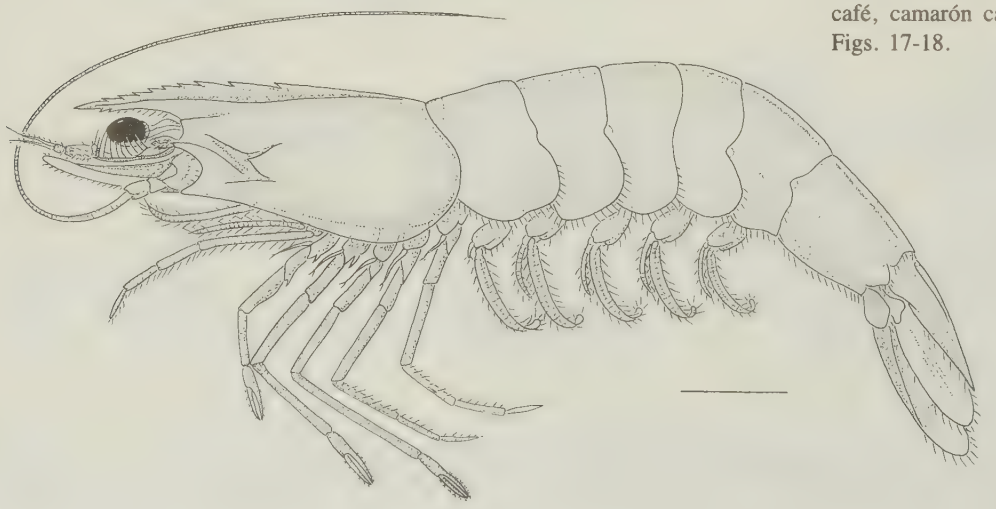

Figure 17
***Penaeus (Farfantepenaeus) aztecus*.**
Lateral view. Scale = 15 mm.

Maximum total length: males, 195 mm; females, 236 mm. Martha's Vineyard, Massachusetts, to the Florida Keys and into the Gulf of Mexico to northwest of Sanibel Grounds, and from Apalachicola to northwestern Yucatán, Mexico. Estuarine and marine to 110 m, rarely to 165 m.

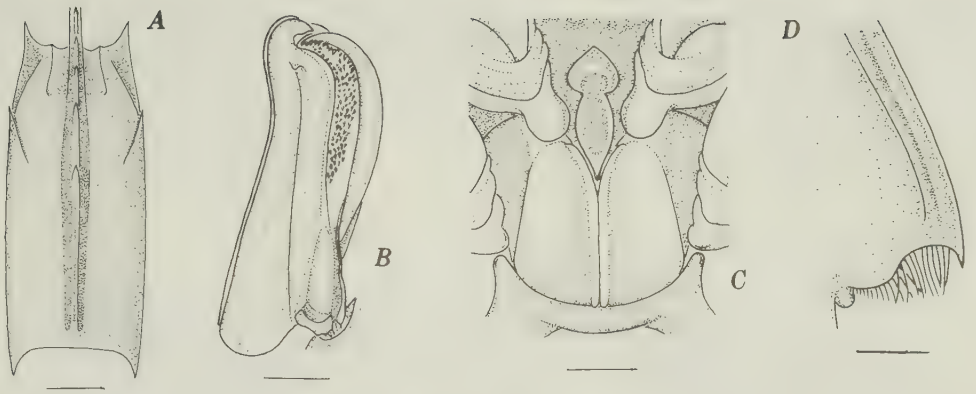

Figure 18

***Penaeus (Farfantepenaeus) aztecus*. A. Dorsal view of carapace. B. Lateral view of right half of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B,C = 2 mm; D = 3 mm.**

7b. Median sulcus short, shallow, and often interrupted. Dorsolateral sulcus narrow, ratio of keel height to sulcus width usually more than 3, sulcus often virtually closed. Petasma with distal part of ventral costa blunt, almost straight, and armed with irregularly arranged group of conspicuous teeth on attached border. Thelycum with anterior and posterior processes narrow ..... ***Penaeus (Farfantepenaeus) paulensis* Pérez Farfante, 1967**

São Paulo shrimp. Langostino rojo, camarón rojo. Camarão rosa. Fig. 19.

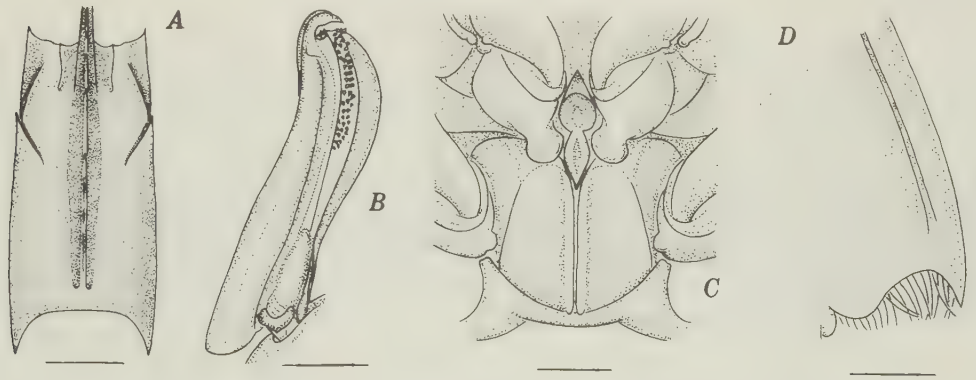

Figure 19

***Penaeus (Farfantepenaeus) paulensis*. A. Dorsal view of carapace. B. Lateral view of right half of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B-D = 3 mm.**

Maximum total length: males, 171 mm; females, 215 mm. Cabo Frio, Brazil, to Buenos Aires Province, Argentina. Estuarine and marine to 55 m, rarely to 130 m.

Key to eastern Pacific species

1a. Adrostral sulcus and adrostral carina short, ending at level of or only slightly posterior to epigastric tooth. Gastrofrontal carina absent. Petasma lacking distomedian projections. Thelycum of "open type," lacking plates and seminal receptacle on sternite XIV. (Subgenus ***Litopenaeus***, "non-grooved species") 2

1b. Adrostral sulcus and adrostral carina long, conspicuously surpassing epigastric tooth, often reaching almost to posterior margin of carapace. Gastrofrontal carina present. Petasma with well developed distomedian projections. Thelycum of "closed type," possessing lateral plates meeting in midline and seminal receptacle on sternite XIV. (Subgenus ***Farfantepenaeus***, "grooved species") 4

2a. Rostrum with 1 or 2 ventral teeth, posterior tooth situated at level of or anterior to anterior dorsal tooth; rostral tooth formula, usually 8-9/1-2, in advance of epigastric tooth. Petasma with free distal part of lateral lobe long (considerably overreaching median lobe) and subelliptical. Thelycum with pair of oblique sharp ridges on anterior part of sternite XIV, mesial part of ridges produced ventrally in sharp auricles; sternite XIII bearing large, semicircular to subrectangular median protuberance ..... ***Penaeus (Litopenaeus) vannamei* Boone, 1931**
White shrimp, white leg shrimp. Camarón blanco, camarón patiblanco, langostino blanco. Fig. 20

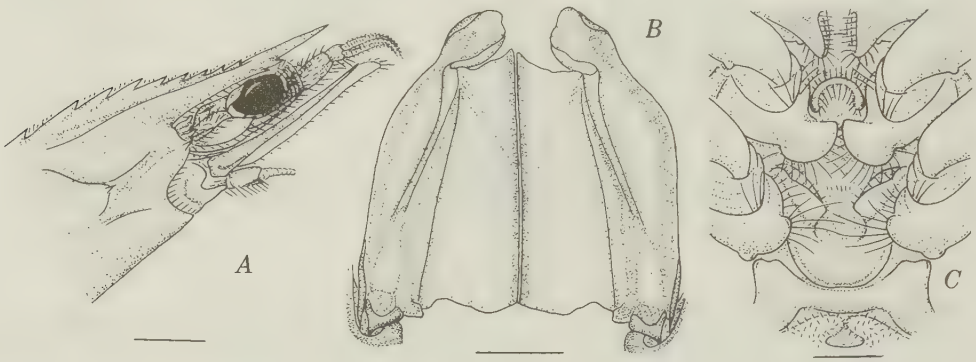

Figure 20
***Penaeus (Litopenaeus) vannamei*. A. Anterolateral view of carapace. B. Dorsal view of petasma. C. Thelycum.**
Scales: A = 10 mm; B,C = 3 mm.

Maximum total length: males, 187 mm; females, 230 mm. Northernmost part of Gulf of California southward to Tumbes, Peru. Estuarine and marine to 72 m.

2b. Rostrum with more than 2 ventral teeth, none situated anterior to anterior dorsal tooth. Petasma with free distal part of lateral lobe short (not overreaching median lobe) or if long, subangular. Thelycum lacking pair of ridges on anterior part of sternite XIV 3

3a. Rostrum usually with dorsal teeth on anterior one-third, rostral tooth formula usually 9-12/3-5, in advance of epigastric tooth. Antennular flagella shorter than peduncle. Petasma with free distal part of lateral lobe (subtriangular but with sinuous borders) very elongate (considerably overreaching median lobe) and outer surface of lobe lacking denticles. Thelycum with pair of inclined posterolateral ridges on sternite XIV, sternite in adult, except posterolateral ridges, densely covered with setae; sternite XIII bearing small median protuberance ..... ***Penaeus (Litopenaeus) occidentalis* Streets, 1871**
Western white shrimp. Camarón blanco, langostino blanco. Fig. 21.

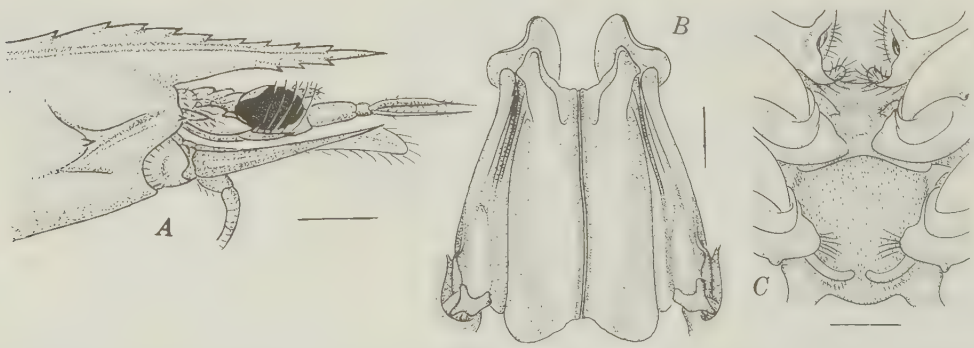

Figure 21
***Penaeus (Litopenaeus) occidentalis*. A. Anterolateral view of carapace. B. Dorsal view of petasma. C. Thelycum.**
Scales: A = 10 mm; B = 3 mm; C = 2 mm.

Maximum total length: males, 190 mm; females, 230 mm. Chiapas, Mexico, southward to Isla Lobos de Tierra, Peru, and Islas Galápagos, Ecuador. Estuarine and marine to 30 m, rarely as much as 155-160 m.

3b. Rostrum lacking dorsal teeth on anterior 1/3; rostral tooth formula usually 5-10/3-8, in advance of epigastric tooth. Antennular flagella longer than peduncle. Petasma with free distal part of lateral lobe short (not overreaching median lobe) and outer surface of lobe armed with irregular rows of denticles situated near terminal border. Thelycum with strong, longitudinally disposed prominence bearing median keel on sternite XIV, latter naked; sternite XIII bearing median ridge .... **Penaeus (Litopenaeus) stylirostris Stimpson, 1874**

Blue shrimp. Camarón azul, camarón blanco, langostino azul, langostino blanco. Fig. 22

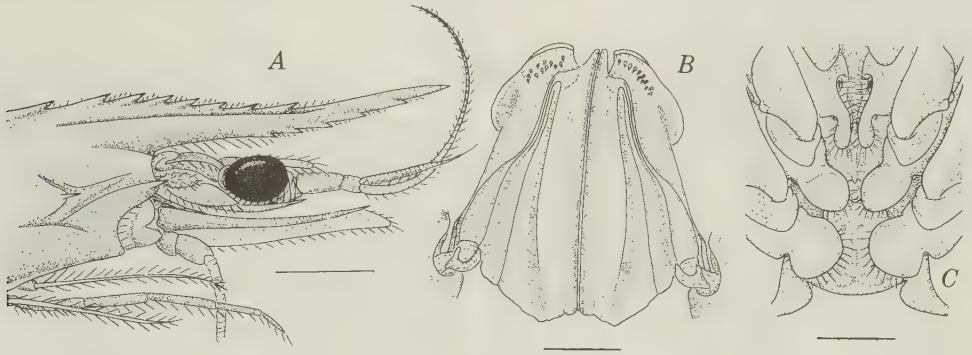

Figure 22

***Penaeus (Litopenaeus) stylirostris*. A. Anterolateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 4 mm.**

Maximum total length: males, 215 mm; females, 263 mm. Gulf of California and Punta Abreojos, Baja California Sur, southward to Paita, Peru. Estuarine to 27 m, rarely to 45 m.

4a. Gastrofrontal carina usually almost indistinct anteriorly. Gastro-orbital carina relatively short, at most occupying posterior 3/5 of distance between hepatic spine and orbital margin. Posterior part of adrostral sulcus directed mesially. Petasma with distomedian projection short, barely overlapping ventral costa; latter subangular, blunt apically, there bearing 1 to 4 small teeth on inner border; distal fold small, not forming auricle. Thelycum with lateral plates of sternite XIV setose anteriorly; posterior process bearing anteriorly bifurcate posteromedian carina ..... ***Penaeus (Farfantepenaeus) brevirostris* Kingsley, 1878**

Red shrimp, pink shrimp, crystal shrimp. Camarón rojo, camarón cristalino, langostino rojo. Fig. 23.

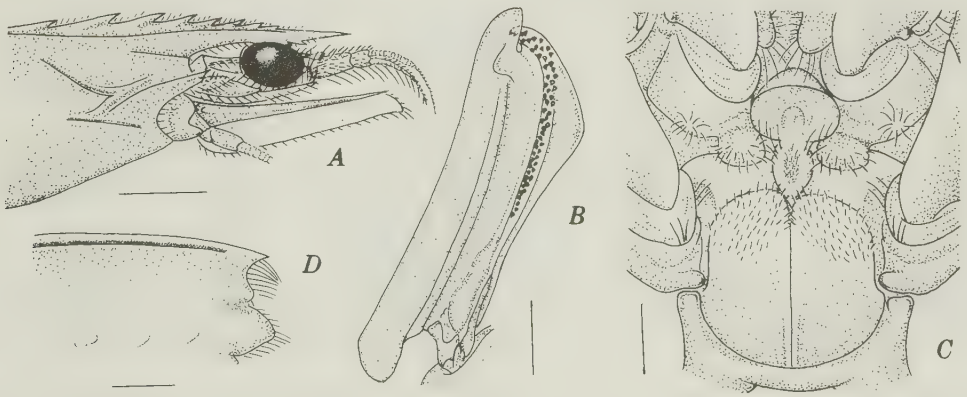

Figure 23

***Penaeus (Farfantepenaeus) brevirostris*. A. Anterolateral view of carapace. B. Dorsolateral view of right half of petasma. C. Thelycum. D. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B-D = 2 mm.**

Maximum total length: males, 150 mm; females, 190 mm. Off northern Sinaloa, Mexico, to SW of Cabo Blanco, Peru, and Islas Galápagos. Estuarine and marine to 120 m, rarely to as much as 183 m.

4b. Gastrofrontal carina well defined anteriorly. Gastro-orbital carina long, occupying at least 4/5 of distance between hepatic spine and orbital margin. Posterior part of adrostral sulcus almost straight. Petasma with distomedian projection long, conspicuously overlapping ventral costa; latter strongly arched, pointed apically, and lacking teeth on inner border; distal fold forming large auricle (protruding considerably inward) bearing small spines. Thelycum with lateral plates of sternite XIV lacking setae; posterior process bearing undivided median carina ..... ***Penaeus (Farfantepenaeus) californiensis*** **Holmes, 1900**
Yellowleg shrimp, golden prawn. Camarón café, camarón pata amarilla, camarón pata colorada. Fig. 24.

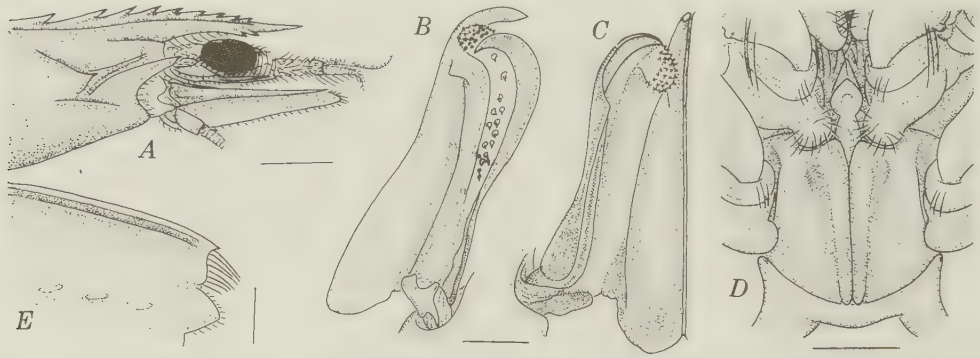

Figure 24
Penaeus (Farfantepenaeus) californiensis. **A. Anterolateral view of carapace. B. Dorsolateral view of right half of petasma. C. Ventrolateral view of same. D. Thelycum. E. Posterodorsal part of sixth abdominal segment. Scales: A = 10 mm; B,C = 2 mm; D = 3 mm; E = 5 mm.**

Maximum total length: males, 153; females, 210 mm. San Francisco Bay, California, southward through the Gulf of California to Callao, Peru, and Islas Galápagos, Ecuador. Estuarine and marine to 50 m, rarely to 180 m.

Genus *Protrachypene* Burkenroad, 1934

Eastern Pacific

Only one species in the genus ..... ***Protrachypene precipua*** **Burkenroad, 1934**
Tití shrimp. Camarón tití, pomada. Fig. 25.

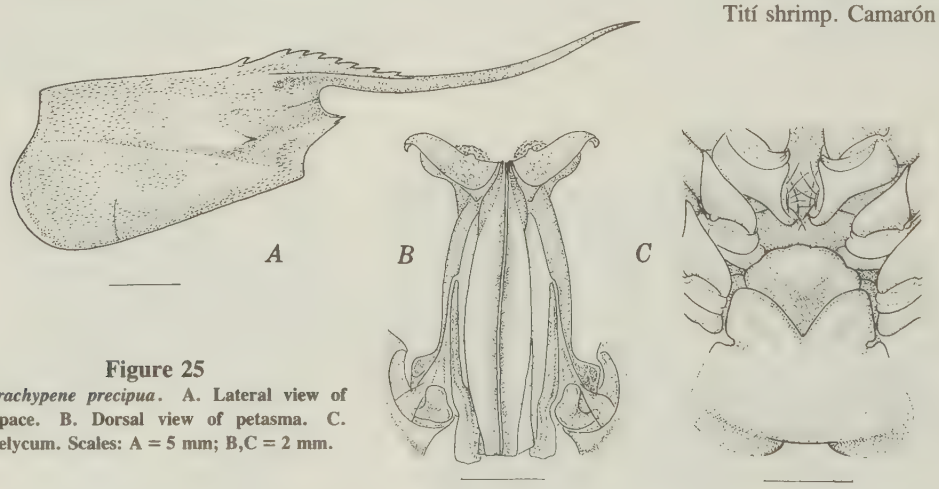

Figure 25
Protrachypene precipua. **A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 5 mm; B,C = 2 mm.**

Rostrum long, styliform, and bearing 7 to 9 teeth in advance of epigastric tooth. First three pairs of pereopods with elongate palms and short dactyls; fourth and fifth pairs very long and flagelliform. Petasma produced in broad lateral horns terminating in proximoventrally directed hook; ventral part of horn (ventrolateral lobule) terminating in semicircular flap surpassing distally dorsal part (dorsolateral lobule). Thelycum with plate of sternite XIV exhibiting anterior margin deeply angular, V-shaped; median protuberance on sternite XIII roughly pentagonal although anterior margin convex.

Maximum total length: males, 91.7 mm; females, 96.5 mm. El Salvador to Tumbes, Peru. Shore to about 40 m.

Key to western Atlantic species

1a. Abdomen naked except for bands of setae flanking dorsal keel of last 2 or 3 segments. Males with protuberance on sternite XIV goblet-shaped, constricted posteriorly; petasma as figured. Females with thelycum setose; anterior margin of plates of sternite XIV strongly convex; anterior margin of median protuberance on sternite XIII convex or subangulate. Exopods of fifth pair of pereopods long, reaching, or almost reaching level of distomesial extremity of basis ..... ***Trachypenaeus constrictus* (Stimpson, 1874)** Roughneck shrimp. Camarón fijador. Camarão ferrinho. Figs. 26-27A-C, Db.

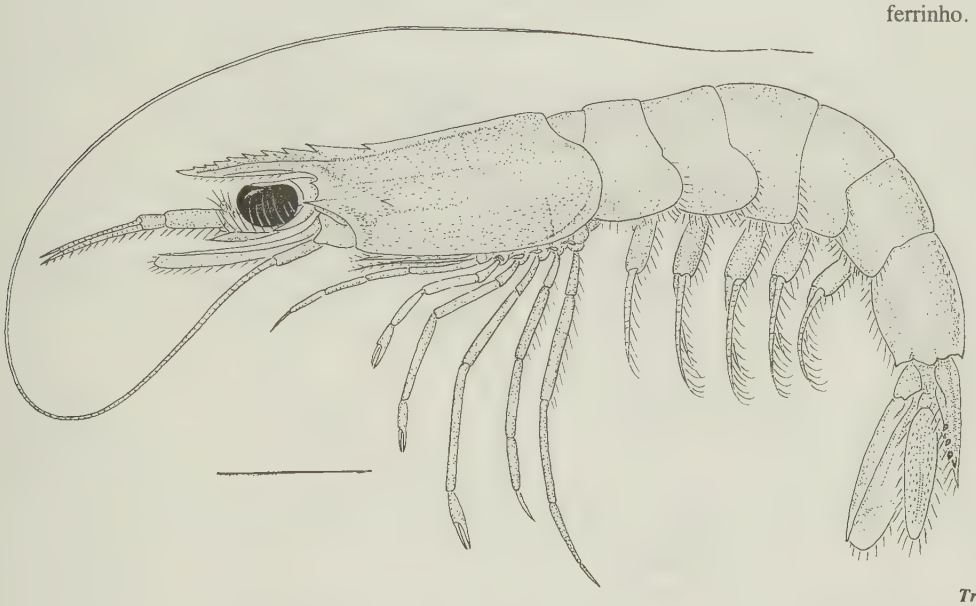

Figure 26
***Trachypenaeus constrictus*. A. Lateral view. Scale = 20 mm.**

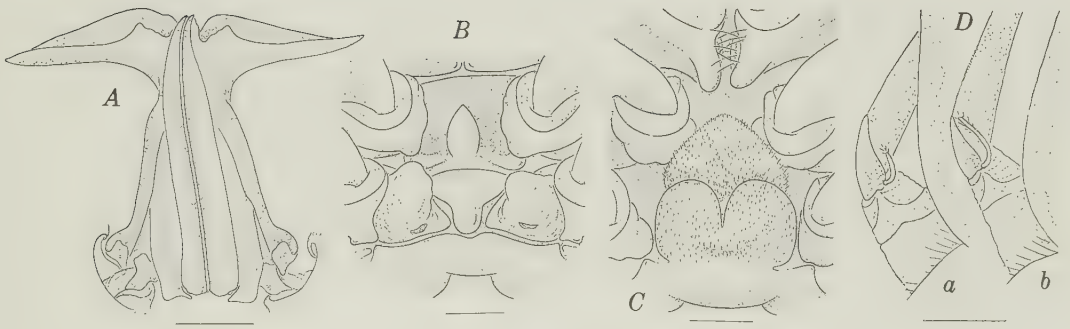

Figure 27
***Trachypenaeus constrictus*. A. Dorsal view of petasma. B. Ventral view of posterior part of thorax in male. C. Thelycum. Db. Exopod of fifth pereopod. *Trachypenaeus similis*. Da. Exopod of fifth pereopod. Scales: A = 0 mm; B-D = 1 mm.**

Maximum total length: males, 71 mm; females, 93 mm. Tangier Sound, Nova Scotia, south Chesapeake Bay, Virginia, Bermuda, and southward through the Gulf of Mexico and Caribbean Sea to Bahia de Zimbros (27°13′S), Brazil. Shallow water to 91 m.

1b. Abdomen with dorsal bands and lateral patches of setae on posterior 3 segments. Males with protuberance on sternite XIV subpyramidal, sloping regularly to posterior apex; petasma as figured. Females with thelycum naked; anterior margin of plates of sternite XIV straight or concave. Exopods of fifth pair of pereopods short, not nearly reaching level of distomesial extremity of basis ..... ***Trachypenaeus similis* (Smith, 1885)**
Yellow roughneck shrimp. Camarón fijador. Figs. 27 Da, 28-29.

Figure 28
***Trachypenaeus similis*. Lateral view. Scale = 10 mm.**

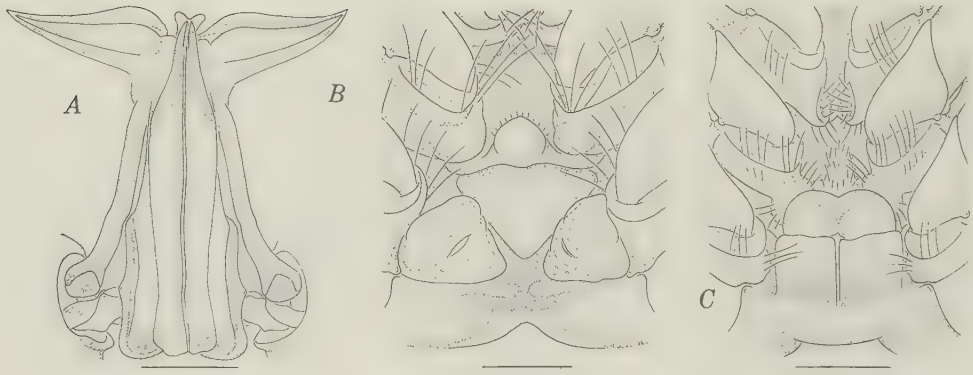

Figure 29
***Trachypenaeus similis*. A. Dorsal view of petasma. B. Ventral view of posterior part of thorax in male. C. Thelycum. Scales: A-C = 2 mm.**

Maximum total length: males, 72 mm; females, 104 mm. Florida Keys through the Gulf of Mexico and Caribbean Sea to S of Ponta de Paqueá, São Paulo, Brazil. Depth 2 to 92 m.

Key to eastern Pacific species

1a. Spine present on posterior end of dorsomedian carina of last 2, 3, or 4 abdominal segments. Telson unarmed. Males with protuberance on sternite XIV roughly spindle shaped, usually traversed by median longitudinal groove; petasma as figured. Thelycum with plates of sternite XIV produced anteriorly in moderately long, subelliptical flaps, falling short of anterior margin of median protuberance on sternite XIII, latter strongly excavate ..... ***Trachypenaeus byrdi* Burkenroad, 1934**
Carabalí shrimp. Camarón cebra, tigre, carabalí, indio; langostino cebra, caravelí. Fig. 30.

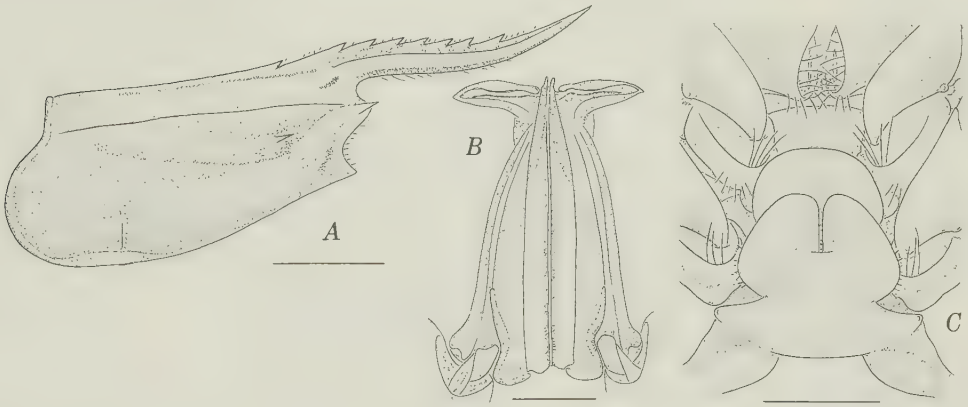

Figure 30
***Trachypenaeus byrdi*. A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 3 mm.**

Maximum total length: males, 134 mm; females, 189 mm. Mexico to northern Peru. Depth 2 to 40 m.

1b. Spine present on posterior end of dorsomedian carina of last abdominal segment only. Telson with posterolateral spines. Males with protuberance on sternite XIV subpyramidal, (sloping to posterior apex). Thelycum with plate(s) of sternite XIV short and subrectangular or produced in elongate flaps, almost reaching anterior margin of median protuberance on sternite XIII 2

2a. Telson with proximal triangular patch of long setae on each side of median sulcus. Petasmal horns with base expanded distally before tapering regularly to apex and anterior margin sinuous. Thelycum with plates of sternite XIV short and subrectangular, not nearly reaching anterior margin of median protuberance on sternite XIII; latter not excavate, usually protruding ventrally on midpart .... ***Trachypenaeus pacificus* Burkenroad, 1934**
Zebra shrimp. Camarón cebra, tigre, carabalí, camaroncillo cebra; langostino cebra; caravelí. Fig. 31.

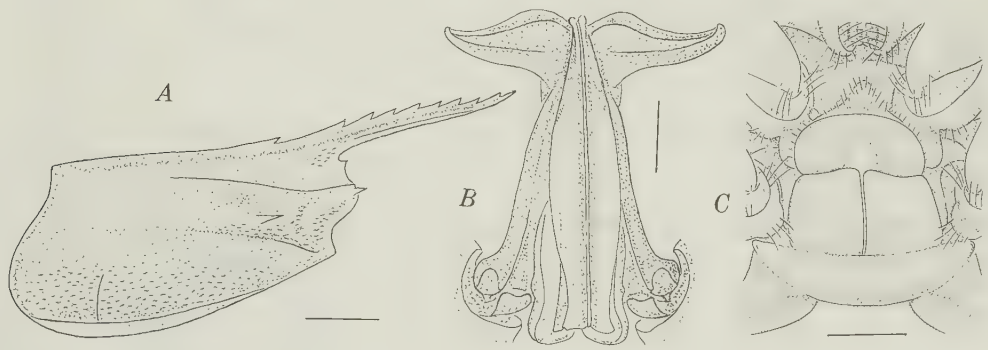

Figure 31
***Trachypenaeus pacificus*. A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 3 mm; B = 1 mm; C = 2 mm.**

NW of Cabo San Quintín, west side of Baja California Sur, and throughout the Gulf of California southward to Tumbes, occasionally to Hiacho, Peru. Depth 5 to 100 m.

2b. Telson lacking proximal patches of long setae. Petasmal horns not expanded basally, tapering regularly to apex, and anterior margin convex. Thelycum with plates of sternite XIV produced anteriorly in elongate, tonguelike flaps, almost reaching anterior margin of median protuberance on sternite XIII; latter deeply excavate 3

3a. Telson with posterior pair of lateral spines fixed. In males, median process on sternite XIII usually ovate (with obtuse or acute apex), occasionally subelliptical; petasma as shown in Figure 33A. Thelycum with plates of sternite XIV bearing oblique narrow bands of setae, and lateral margins strongly curved posteromesially, forming acute angle at junction with posterior thoracic ridge ..... ***Trachypenaeus fuscina* Pérez Farfante, 1971**
Pinto shrimp. Camarón cebra, tigre, carabalí; langostino cebra. Figs. 32-33.

Figure 32
***Trachypenaeus fuscina*. A. Lateral view. Scale = 10 mm.**

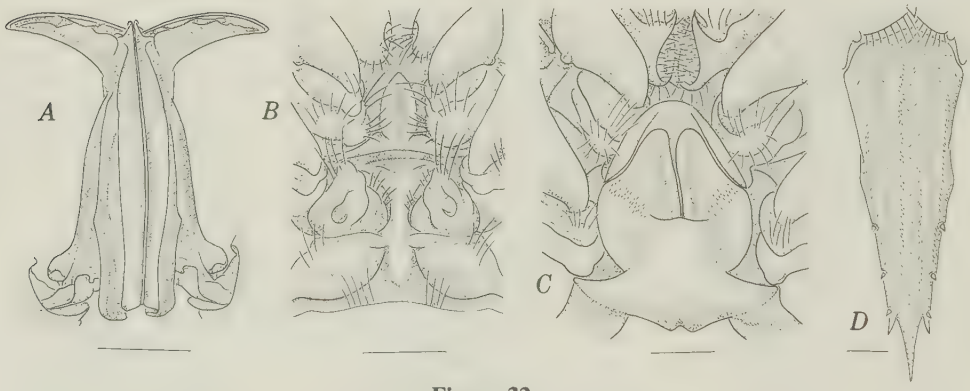

Figure 33
***Trachypenaeus fuscina*. A. Dorsal view of petasma. B. Ventral view of posterior part of thorax in male. C. Thelycum. D. Telson. Scales = 2 mm.**

Maximum length: males, 108 mm; females, 150 mm. Golfo de Tehuantepec, Mexico, to Paita, northern Peru. Depth 5 to 100 m.

3b. Telson with posterior pair of lateral spines movable. In males, median process on sternite XIII subtrapezoidal (widest anteriorly) to suborbicular; petasma similar to that of *T. fuscina*. Thelycum with plates of sternite XIV bearing broad lateral patches of setae and lateral margins almost straight, forming about 90° angles with posterior thoracic ridge ..... ***Trachypenaeus faoe* Obarrio, 1954**
Indio shrimp. Camarón cebra, tigre, carabalí; langostino cebra. Fig. 34.

Figure 34

***Trachypenaeus faoe*. A. Ventral view of posterior part of thorax in male. B. Thelycum. C. Telson. Scales: A,B = 2 mm; C = 4 mm.**

Maximum total length: females, at least 100 mm, probably more. Southern part of Gulf of California (off Isla Altamura, Sinaloa, Mexico) southward to Golfo de Guayaquil, Ecuador. Sublittoral to 24 m.

Genus *Xiphopenaeus* Smith, 1869

Rostrum long, sinuous, with very elongate, styliform anterior part varyingly elevated and armed with only dorsal teeth (usually five) basally. Carapace with epigastric tooth situated distinctly posterior to first (posterior) rostral tooth. Longitudinal suture long, reaching about midlength of carapace; transverse suture lacking in adults. Last two pairs of pereopods long, flagelliform, with elongate multiarticular dactyls. Petasma produced distolaterally in pair of relatively broad horns. Thelycum with plate of sternite XIV broad, protuberance of sternite XIII quite short, and slit between them almost horizontal.

Western Atlantic

Only one species in the region ..... ***Xiphopenaeus kroyeri* Heller, 1862**
Seabob, Atlantic seabob. Redi sara-sara, Bugi sara-sara. Camarón siete barbas. Camarão chifrudo, camarão sete barbas, piticaia. Fig. 35.

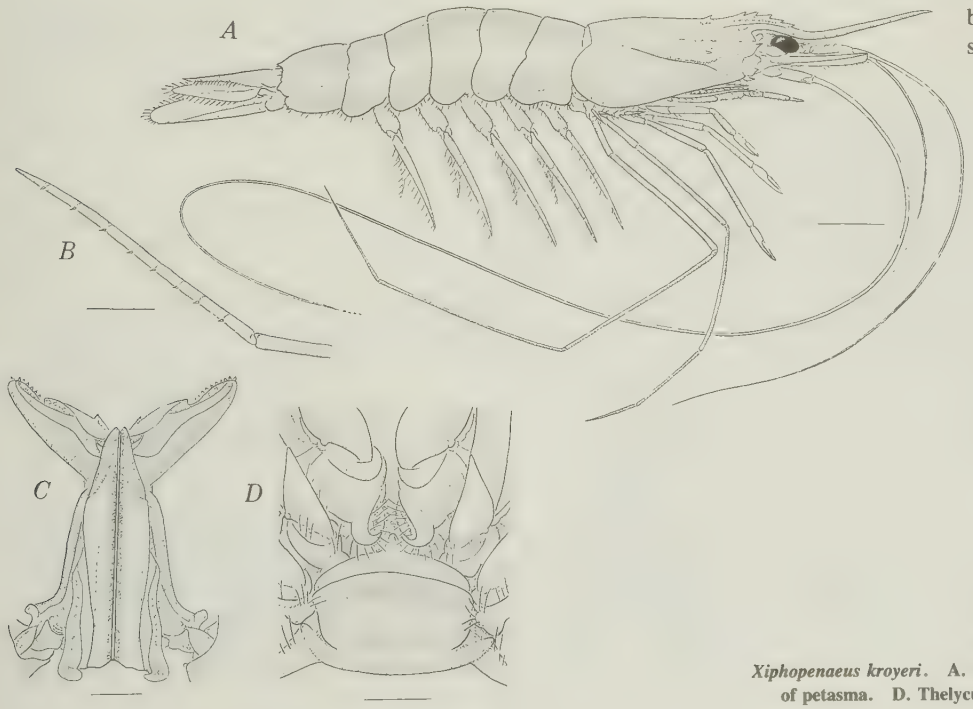

Figure 35

***Xiphopenaeus kroyeri*. A. Lateral view. B. Dactyl. C. Dorsal view of petasma. D. Thelycum. Scales: A,B = 1 mm; C,D = 2 mm.**

Maximum total length: males, 115 mm; females, 140 mm. North Carolina (between Cape Hatteras and Cape Lookout) south through the Gulf of Mexico and the Caribbean Sea to Ponta do Zimbros, Santa Catarina, Brazil. Estuaries and offshore to 70 m.

Eastern Pacific

Only one species in the region ..... ***Xiphopenaeus riveti* Bouvier, 1907**
Pacific seabob. Botalón, camarón barbón, siete barbas, tití, langostino tití. Fig. 36.

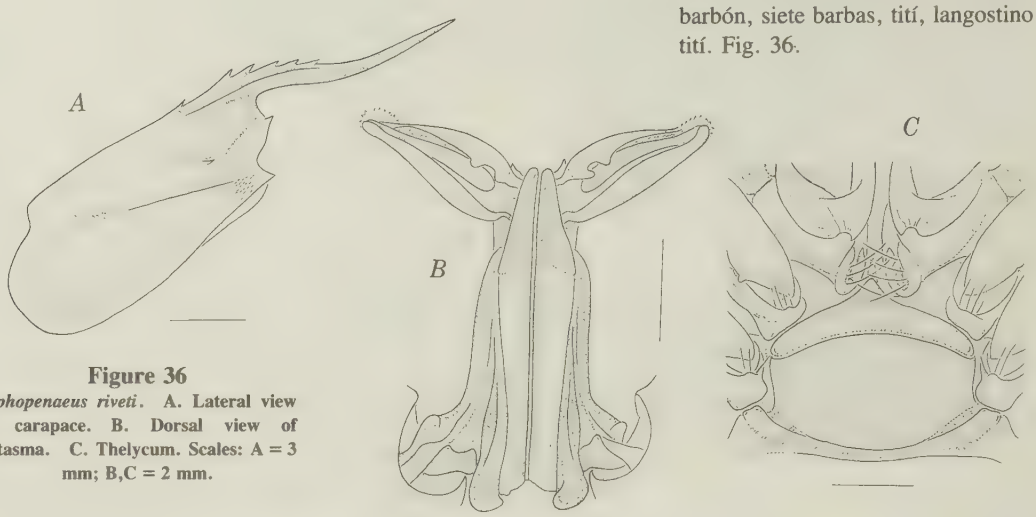

Figure 36
***Xiphopenaeus riveti*. A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 3 mm; B,C = 2 mm.**

Maximum total length: females, 170 mm. Gulf of California, Mexico, to Paita, Peru. Depth 3 to 70 m.

Family SICYONIIDAE Ortmann, 1898

Genus *Sicyonia* H. Milne Edwards, 1830

Key to western Atlantic species

1a. Postrostral carina almost always with 3 teeth posterior to level of hepatic spine, occasionally anterior one of these at level of or slightly anterior to hepatic spine. Rostrum bearing 2 dorsal teeth, rarely 3. Petasma with distal projection of dorsolateral lobule short, its apical part curved dorsally. Thelycum with plate of sternite XIV almost flat or slightly raised laterally in paired low bulges .....
..... ***Sicyonia brevirostris* Stimpson, 1874**
Brown rock shrimp, hardback. Camarón conchiduro, camarón de piedra, camarón de roca. Fig. 37

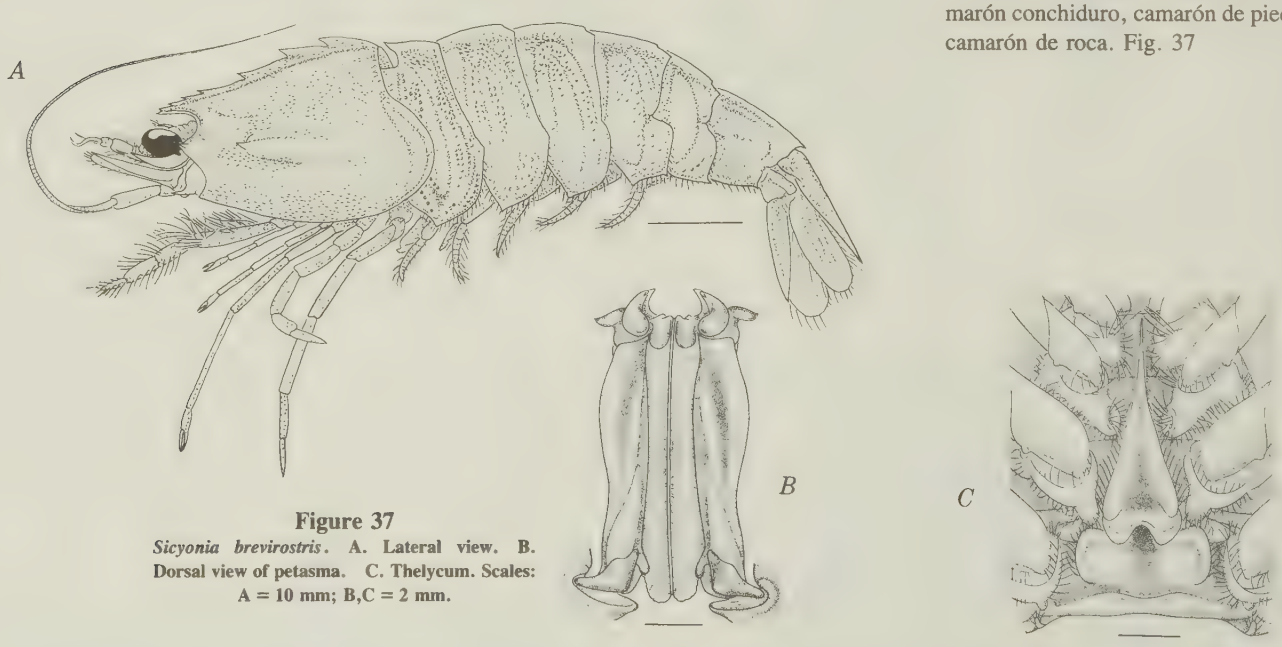

Figure 37
***Sicyonia brevirostris*. A. Lateral view. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 2 mm.**

Maximum total length: males, about 125 mm; females, about 130 mm. In the western Atlantic: off Norfolk, Virginia, along the coast of the United States, and through the Bahamas to the southern coast of Cuba, and around the Gulf of Mexico from the Florida Keys to Isla Contoy, Yucatán (perhaps also off Guyana). In the eastern Pacific: off southern Mexico, from Colimas to Chiapas; however, its occurrence in this region needs confirmation. Sublittoral to 190 m (rarely to 329 m).

1b. Postrostral carina with 2 teeth posterior to level of hepatic spine. Rostrum bearing 1 or 2 teeth. Petasma and thelycum similar to those of *S. brevirostris* (Fig. 38) ..... ***S. typica* (Boeck, 1864)**
Kinglet rock shrimp. Camarón reyecito, camarón de piedra. Camarão da pedra. Fig. 38.

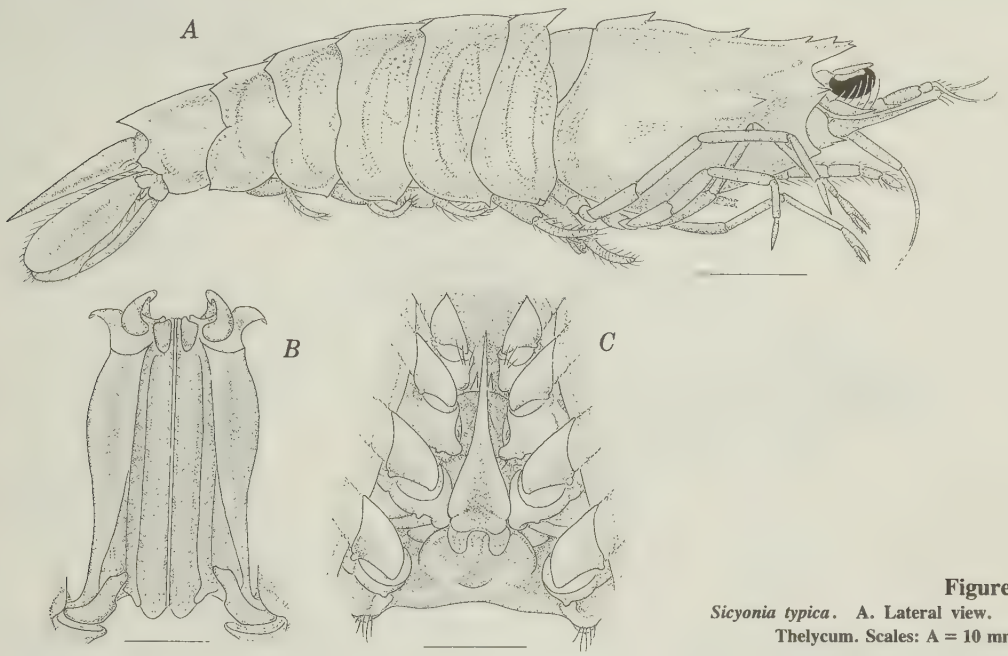

Figure 38
***Sicyonia typica*. A. Lateral view. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B = 1 mm; C = 2 mm.**

Maximum total length: females, 74 mm. Off Wrightsville Beach, North Carolina, southward through the Gulf of Mexico to Caribbean Sea (Antilles, Central and South America) and along the Atlantic coast of South America to SE of Ilha de Santa Catarina, Brazil. Shallow water to 101 m.

Key to eastern Pacific species

1a. Postrostral carina with 2 or 3 teeth posterior to level of hepatic spine 2

1b. Postrostral carina with 1 tooth posterior to level of hepatic spine 3

2a. Postrostral carina almost always with 3 teeth posterior to level of hepatic spine, occasionally anterior one of these at level of or slightly anterior to hepatic spine. Rostrum bearing 2 dorsal teeth, rarely 3. Petasma with distal projection of dorsolateral lobule short, its apical part curved dorsally. Thelycum with plate of sternite XIV almost flat or slightly raised laterally in paired low bulges. Branchiostegite lacking large spot ..... ***Sicyonia brevirostris* Stimpson, 1874**
Brown rock shrimp, hardback. Camarón conchiduro, camarón de piedra, camarón de roca. Fig. 37.

Maximum total length: males, about 125 mm; females, about 130 mm. In the eastern Pacific: off southern Mexico, from Colimas to Chiapas; however, its occurrence in this region needs confirmation. Depth not included in the few records reported. In the western Atlantic: from Norfolk, Virginia, along the coast of the United States and the Bahamas to the southern coast of Cuba, and around the Gulf of Mexico from the Florida Keys to Isla Contoy, Yucatán (perhaps also off Guyana).

2b. Postrostral carina with 2 teeth posterior to level of hepatic spine, never with tooth at level of or slightly anterior to hepatic spine. Rostrum usually bearing 1 dorsal tooth (rarely 2). Petasma with distal projections extremely long and slender. Thelycum with plate of sternite XIV raised in strong bulges. Branchiostegite with moderately large, purplish brown spot sometimes bearing poorly defined but diffuse yellow center ..... ***Sicyonia penicillata* Lockington, 1879**
Rock shrimp, target shrimp, peanut rock shrimp. Cacahuete, camarón de piedra, camarón de roca. Fig. 39.

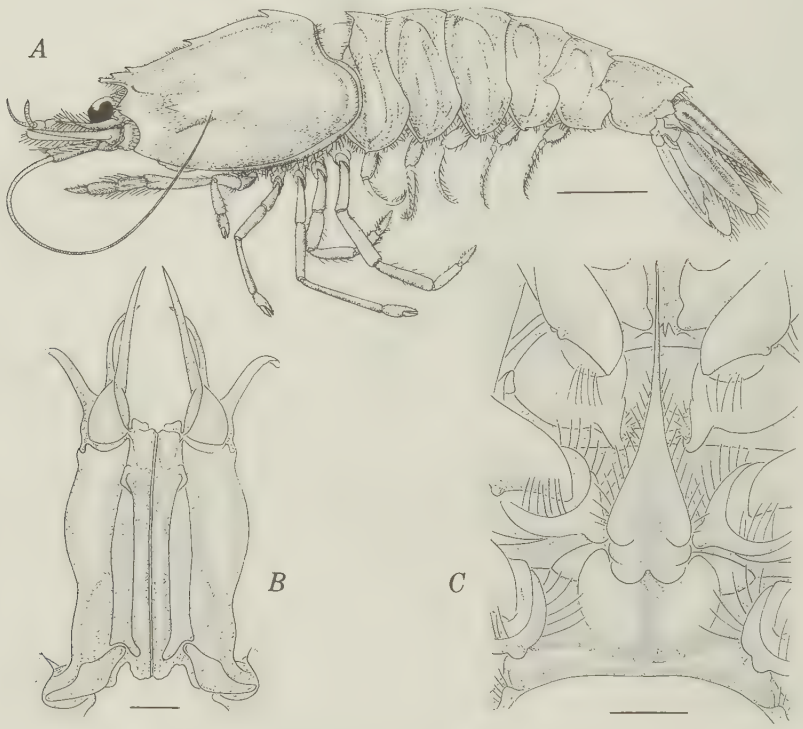

Figure 39
***Sicyonia penicillata*. A. Lateral view. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B = 1 mm; C = 2 mm.**

Maximum total length: males, about 130 mm; females, about 110 mm. From southwest of Punta Canoas (29°20′N), Baja California Norte, southward to Bahía San Lucas, and in the Gulf of California, from the northern end to Bahía Concepción on the west and to Punta Arbolata, Sinaloa, on the east. Its recorded presence off Punta Arenas, Costa Rica, needs confirmation. Depth 0.60 to 180 m.

3a. Dorsomedian carina of first abdominal segment produced into tooth considerably larger than posterior tooth on carapace. Petasma with distal projections of dorsolateral lobules turned mesially and lacking terminal filament. Thelycum with posterior component of median plate flat or slightly raised posterolaterally, not bearing short bosses cut by transverse suture ..... ***Sicyonia disdorsalis* (Burkenroad, 1934)**
Rock shrimp, keel rock shrimp. Camarón conchiduro, camarón duro, langostino cáscara dura. Fig. 40.

Maximum total length: males, 88.8 mm; females, 98.7 mm. Bahía Santa María to the tip of Baja California Mexico, and from off the central coast of Sonora, Gulf of California, southward to Callao, Peru. Depth 5 to 139-93 m.

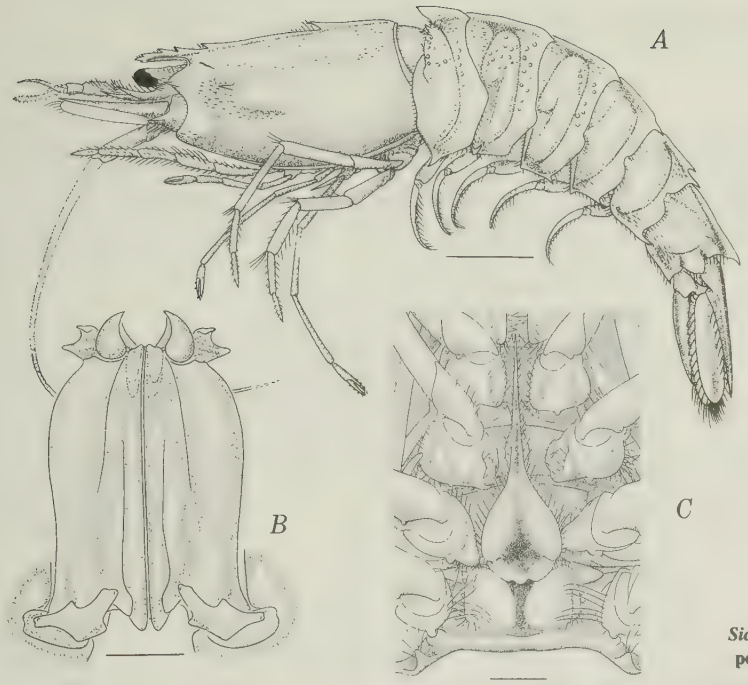

Figure 40
Sicyonia disdorsalis. A. Lateral view. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B = 1 mm; C = 2 mm.

3b. Dorsomedian carina on first abdominal segment produced into tooth smaller or only slightly larger than posterior tooth on carapace. Petasma with distal projections of dorsolateral lobules divergent and produced in short filament. Thelycum with posterior component of median plate bearing paired short lateral bosses cut by transverse suture ..... ***Sicyonia ingentis* (Burkenroad, 1938)**
Ridge back prawn, rock shrimp, Pacific rock shrimp. Camarón de piedra, cacahuete. Fig. 41.

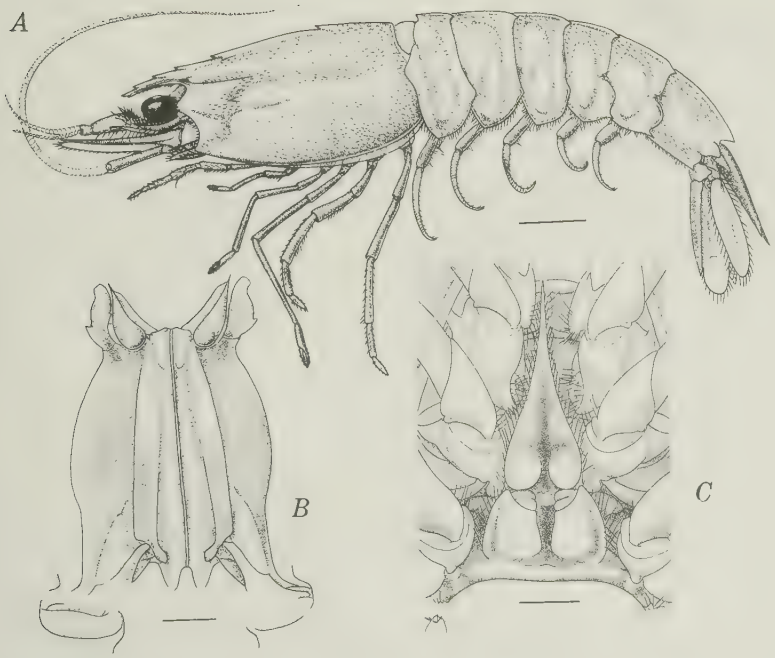

Figure 41
Sicyonia ingentis. A. Lateral view. B. Dorsal view of petasma. C. Thelycum. Scales: A = 10 mm; B = 1 mm; C = 2 mm.

Maximum total length: males, about 157 mm; females, about 180 mm. Monterey Bay, California, southward to Isla María Madre (22°00′N), and throughout the Gulf of California. Depth 5 to 183 m, occasionally to 293-307 m.

Family SOLENOCERIDAE Wood-Mason, 1891

Key to genera
(Ranges noted refer only to American waters)

1a. Dorsal and ventral antennular flagella flattened. Lateral ramus of uropod lacking distolateral spine ..... ***Solenocera*** (Eastern Pacific)

1b. Dorsal and ventral flagellum subcylindrical. Lateral ramus of uropod armed with distolateral spine 2

2a. Epigastric tooth separated from first (posterior) rostral tooth by interval not conspicuously greater than that between first and second rostral teeth. Suprahepatic spine lacking ..... ***Pleoticus*** (Western Atlantic)

2b. Epigastric tooth separated from first rostral tooth by interval conspicuously greater than that between first and second rostral teeth. Suprahepatic spine present ..... ***Haliporoides*** (Eastern Pacific)

Genus *Haliporoides* Stebbing, 1914

Eastern Pacific

Only one species in American waters ..... ***Haliporoides diomedeae*** **(Faxon, 1893)** Chilean knife shrimp. Gamba roja, camarón cuchilla, camarón de profundidad. Fig. 42.

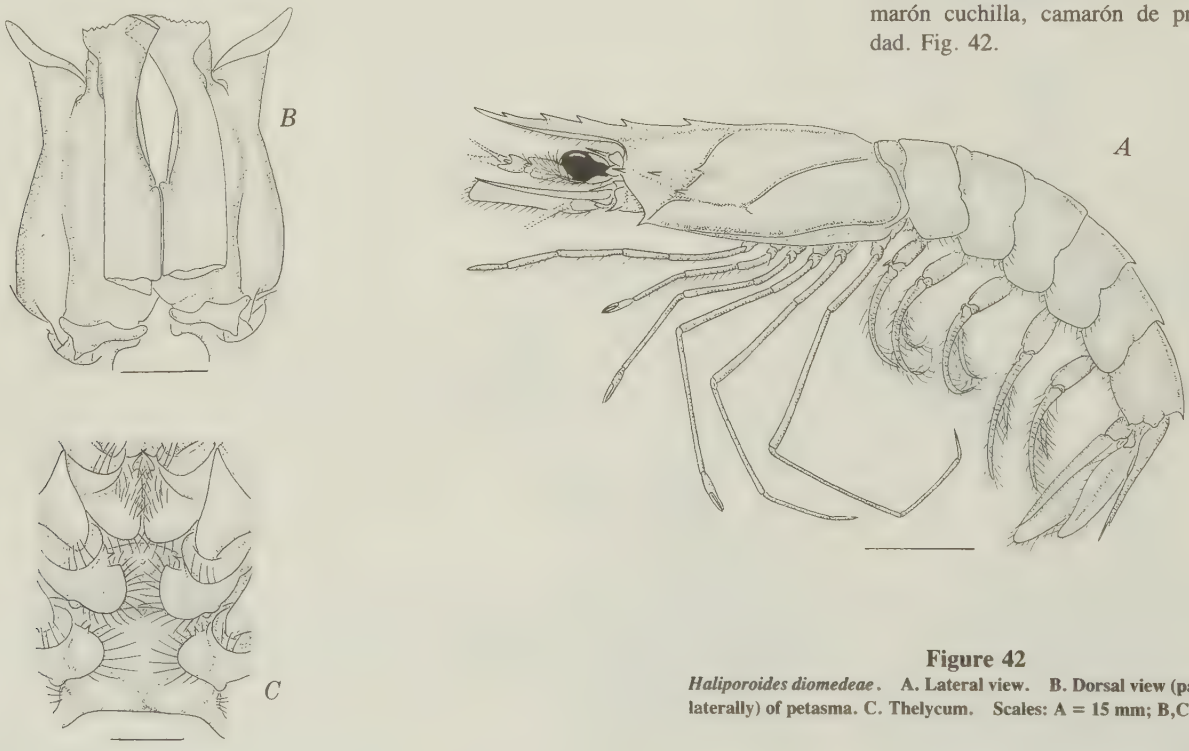

Figure 42
***Haliporoides diomedeae*. A. Lateral view. B. Dorsal view (partly bent laterally) of petasma. C. Thelycum. Scales: A = 15 mm; B,C = 3 mm.**

Rostrum moderately long, at most slightly overreaching antennular peduncle; armed with 2 to 5 dorsal teeth; epigastric tooth separated from first rostral tooth by long interval. Cervical carina bearing 1 well developed suprahepatic spine, occasionally accompanied by smaller more dorsal one. Petasma with row of cincinnuli short, occupying about proximal 1/3 of median line; ventromedian lobule abruptly broadening distally and with lateral part of terminal margin serrate. Thelycum lacking ridge or strong protuberance on sternite XIV, latter smoothly convex, often bearing minute central tubercle; posterior part of sternite XIII armed with strong median protuberance.

Maximum total length: males, 198 mm; females, 215 mm. Off Península de Azuero, Panama, to Talcahuano, Chile (36°40′S). Depth 240 to 1,866 m.

Key to western Atlantic species

1a. Body polished. Rostrum reaching at most distal third of second antennular article. Posterior part of submarginal carina lying well dorsal to ventral margin of carapace. Petasma cincinnulate along only proximal 2/5 of median line; distal part of ventromedian lobule cornified and bearing terminal suboval projection and lateral, spurlike one. Thelycum with anterior part of sternite XIV bearing pair of slightly convex, small plates, each with 2 minute tubercles; sternite XIII bearing heavy, strongly produced, median projection ..... ***Pleoticus muelleri* (Bate, 1888)**
Argentine red shrimp. Langostino, langostín. Lagostinho da Argentina, camarão de Santana, camarão vermelho. Fig. 43.

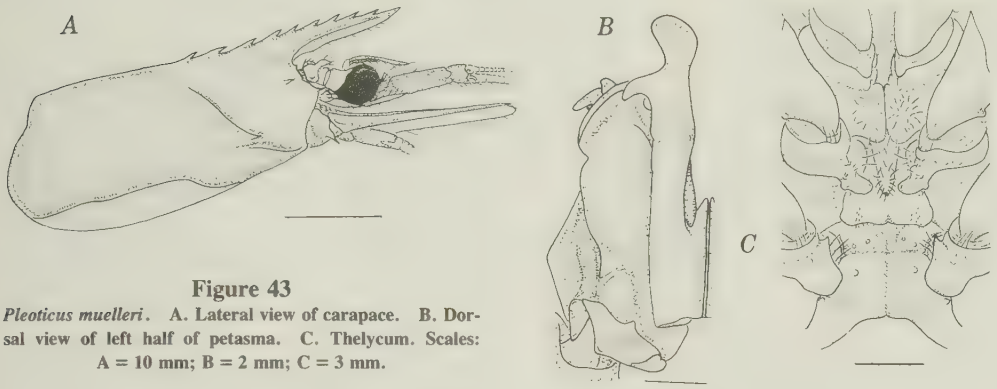

Figure 43
***Pleoticus muelleri*. A. Lateral view of carapace. B. Dorsal view of left half of petasma. C. Thelycum. Scales: A = 10 mm; B = 2 mm; C = 3 mm.**

Maximum total length: unrecorded in males (37.5 mm cl); females, 190 mm (58 m cl). Praia de Santana, Espírito Santo, Brazil, southward to northwestern Golfo de San Jorge, Comodoro Rivadavia, Argentina. Depth 2 to 100 m.

1b. Body densely covered with minute setae. Rostrum nearly reaching or slightly overreaching antennular peduncle. Entire submarginal carina lying adjacent to ventral margin of carapace. Petasma cincinnulate along entire median line; ventromedian lobule rather flexible and lacking projections. Thelycum with anterior part of sternite XIV bearing pair of strong, usually anteriorly curved, subtriangular projections; sternite XIII armed with rather strong but low anteromedian ridge ..... ***Pleoticus robustus* (Smith, 1885)**
Royal red shrimp. Camarón rojo gigante, camarón real rojo, langostino rojo. Figs. 44-45.

Figure 44
***Pleoticus robustus*. Lateral view. Scale = 10 mm.**

Figure 45
***Pleoticus robustus*. A. Dorsolateral view of left half of petasma. B. Thelycum. Scales: A,B = 3 mm.**

Maximum total length: males, 180 mm; females, 225 mm. South of Martha's Vineyard (40°00′15″N) through the Gulf of Mexico and the Caribbean Sea to French Guiana. Upper continental slope, 180 to 730 m.

Key to eastern Pacific species

1a. Rostral plus epigastric teeth 8 to 10, usually 9. Pterygostomian spine broad based, joining carapace dorsally in gentle curve. Petasma with distal projection of ventromedian lobule rounded. Thelycum with pair of projections on sternite XIV large, their length greater than half median length of sternite; median protuberance on sternite XIII not raised (ventrally) in paired projections. ..... ***Solenocera agassizii* Faxon, 1893**
Ocean pink, kolibri shrimp. Camarón chupaflor, camarón rojo. Fig. 46.

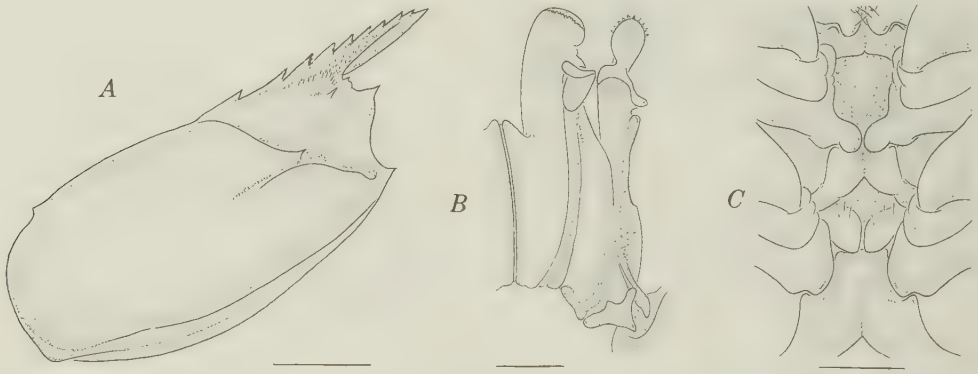

Figure 46
***Solenocera agassizii*. A. Lateral view of carapace. B. Dorsal view of right half of petasma. C. Thelycum. Scales: A = 10 mm; B,C = 3 mm.**

Maximum total length: males, 115 mm; females, 149 mm. Off Cabo Blanco, Costa Rica, to Islas Lobos de Afuera, Peru. Depth 86 to 384 m.

1b. Rostral plus epigastric teeth 5 to 8, usually 6 or 7. Pterygostomian spine narrow based, joining carapace dorsally at about right angle. Petasma with distal projection of ventromedian lobule subacute or subtruncate. Thelycum with pair of projections on sternite XIV small, their length not more than half median length of sternite; median protuberance on sternite XIII raised (ventrally) in paired conspicuous projections 2

2a. Petasma with distal projection of ventromedian lobule subtruncate and bent dorsally in lapel-like fashion; distal projection of ventrolateral lobule saberlike and long, reaching as far distally as projection of ventromedian lobule. Thelycum with sternite XIII lacking anteromedian elevation and with median protuberance, acutely concave posteriorly, bearing anterior tubercle ..... ***Solenocera florea* Burkenroad, 1938**
Camarón chupaflor, camarón rojo, fidel. Figs. 47-48.

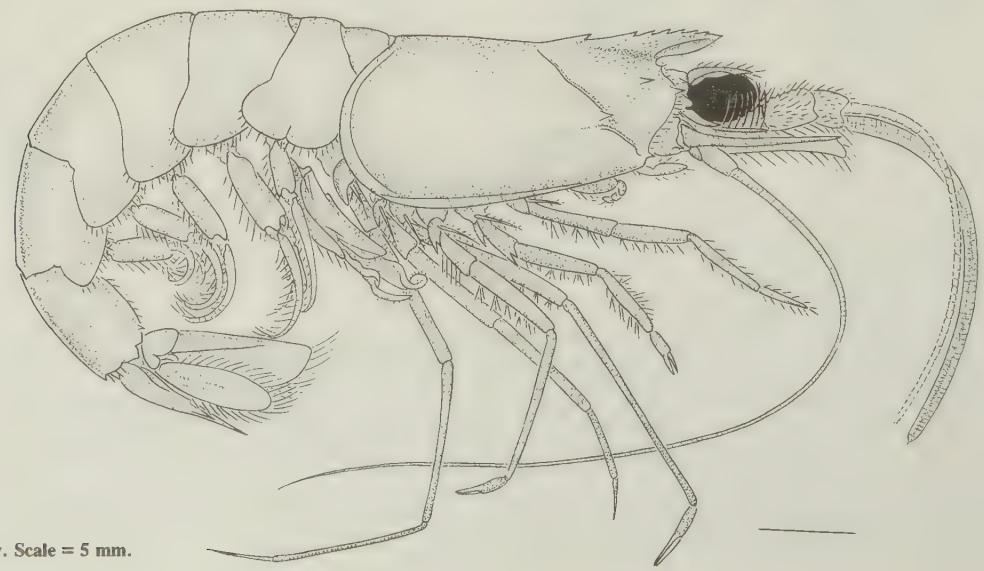

Figure 47
***Solenocera florea*. Lateral view. Scale = 5 mm.**

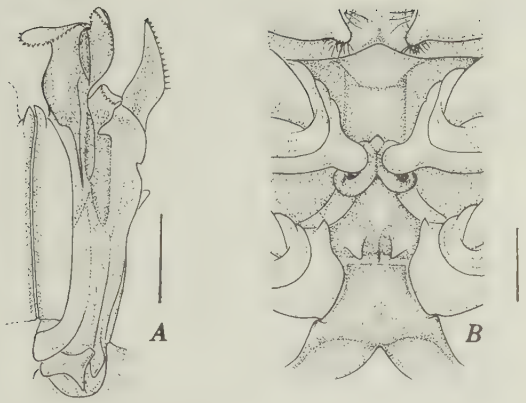

Figure 48
Solenocera florea. A. Dorsal view of right half of petasma. B. Thelycum. Scales: A,B = 2 mm.

Maximum total length: males, 72 mm; females, 80.3 mm. Off Boca de las Animas, along the west coast of Baja California Sur[2], and from Isla Altamura, Sinaloa, Mexico, southward to SW of Punta Pimentel, Peru. Depth 13-183 m.

[2]This is the first time that *S. florea* has been recorded from the ocean side of Baja California Sur. In addition to the material from Boca de las Animas, hundreds of specimens deposited at the Scripps Institution of Oceanography were obtained from various localities along the coast of the peninsula to Bahía Todos Santos.

2b. Petasma with distal projection of ventromedian lobule tapering to mesial apex and not bent dorsally; distal projection of ventrolateral lobule elliptical and short, falling considerably short of apex of ventromedian lobule. Thelycum with sternite XIII bearing blunt anteromedian elevation and with median protuberance, strongly convex posteriorly, lacking anterior tubercle ..... ***Solenocera mutator* Burkenroad, 1938**
Little humpback shrimp. Camaroncito rojo. Fig. 49.

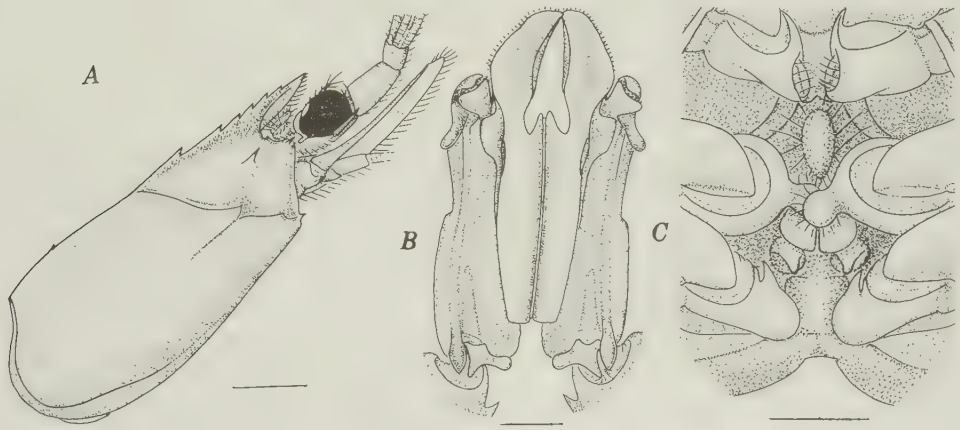

Figure 49
Solenocera mutator. A. Lateral view of carapace. B. Dorsal view of petasma. C. Thelycum. Scales: A = 5 mm; B,C = 2 mm.

Maximum total length: males, 72 mm; females, 78 mm. Off southern California, along the west coast of Baja California Norte and Sur, Gulf of California, and southward to Isla Lobos de Tierra, Peru. Depth 2-236 m.

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Glossary[1]

This glossary is intended for use in the identification of penaeidean shrimps.

Abdomen "Tail" or that part of the body posterior to the cephalothorax, consisting of six body segments or somites and the telson.

Adrostral carina Ridge flanking the rostrum, sometimes nearly reaching the posterior margin of the carapace.

Adrostral sulcus Groove flanking the rostrum mesial to the adrostral carina, sometimes nearly reaching the posterior margin of carapace.

Antenna, pl. nae More lateral of the two paired flagellate appendages projecting anteriorly from the anterior end of the body.

Antennal flagellum Multiarticulate, whiplike terminal part of the antenna.

Antennal peduncle Basal articles of the antenna, from which the flagellum arises.

Antennal region Area on the lateral face of the carapace posterior to and encompassing the antennal spine.

Antennal spine Spine present on the anterior margin of the carapace just ventral to the orbital margin.

Antennular flagella Multiarticulate paired filaments (sometimes flattened and lamellate) of the antennule.

Antennular peduncle Basal articles of the antennule, from which the flagella arise.

Antennule More mesial of the two paired flagellate appendages projecting from the anterior end of the body.

Anterior process Anterior part of an elongate median protuberance lying on the penultimate (XIII) thoracic sternite.

Appendix interna, pl. dices -nae Slender lappet, sometimes rodlike, at the mesial base of the endopod of the second pleopod of many males.

Appendix masculina, pl. dices- nae Lappet, sometimes scalelike, at the mesial base of the endopod of the second pleopod (dorsal to the appendix interna if latter is present).

Arthrobranchia, pl. -chiae Branchia attached to the joint area between the body and the first segment of a leg.

Article Any one of the divisions of a segmented appendage.

Articular membrane Uncalcified integument at a joint permitting movement of the exoskeleton, as between the segments of a pereopod.

Basis, pl. -ses Second podomere, or segment, from the proximal end of a typically 7-segmented appendage.

Branchia, pl. -chiae Respiratory organ (gill) associated with an appendage or the body wall.

Branchial region Portion of the carapace overlying the branchial cavity.

Branchiostegal spine Short spine on or near the anterior margin of the carapace ventral to the antennal spine and dorsal to the anteroventral angle of the carapace.

Branchiostegite Expanded lateral part of the carapace covering the gills.

Carapace "Head shield" covering the cephalothoracic segments of the body.

Carpus, pl. -pi Fifth podomere from the proximal end of a typically 7-segmented appendage.

Cephalothorax Fused anterior part of the body bearing all of the appendages except the pleopods and uropods.

Cervical sulcus Groove sometimes present on the carapace; it is mesially transverse, laterally oblique, and extends from or near the hepatic sulcus toward the middorsal line of the carapace.

Chela, pl. -ae Pincer formed by the two distal podomeres, or segments, of a pereopod in which the movable finger or dactyl opposes a fixed finger formed by a distal extension of the propodus.

Cicatrix, pl. -ices Longitudinal disposed ridge(s) often present on the sixth abdominal segment.

Cincinnuli Minute interlocking processes projecting from the dorsomesial margins of the petasmal endopods.

Closed thelycum Female structures (plates and protuberances) on the posterior two thoracic sternites associated with or covering the seminal receptacle(s).

Cornea Faceted portion of the eye.

Coxa, pl. -ae First or proximal segment of a typically 7-segmented appendage.

Dactyl Terminal segment of a typically 7-segmented appendage.

Dendobranchiate gill One in which the paired primary branches are subdivided, sometimes highly so.

Distomedian fold Distal pleat in the dorsolateral lobule of the petasma.

Distomedian projection Distal, relatively narrow extension of the dorsomedian lobule of the petasma.

Dorsolateral lobule Dorsal part of the lateral lobe of the petasma.

Dorsolateral sulcus Longitudinal groove sometimes present close to the dorsomedian line of the sixth abdominal segment.

Dorsomedian carina Ridge extending along the middorsal line of the abdominal segments.

Dorsomedian lobule Mesial part of the median lobe of the petasma.

Endopod Mesial branch of a bifurcate appendage, especially one arising from the basis or from the protopodite of the pleopod.

Epigastric tooth Tooth on the carapace situated above the gastric region behind the first (posterior) rostral tooth.

Exopod Lateral branch of a bifurcate appendage arising from the basis or from the protopodite of the pleopod.

Eyestalk Peduncle or unfaceted portion of the eye supporting the cornea.

Flagellum, pl. -la Multiarticulate, usually whiplike terminal part of the antennule or antenna.

Frontal region Anterior area of the carapace lying between the orbits and bounded posteriorly by the gastric region.

Gastric region Principal mesial area on the carapace lying anterior to the cervical sulcus and bounded posteriorly by the cardiac region, laterally by the branchial and hepatic regions, and anteriorly by the frontal and orbital region.

Gastrofrontal carina Short longitudinal ridge extending posteriorly from the ventral extremity of the orbital margin.

Gastrofrontal sulcus Short longitudinal depression accompanying the gastrofrontal carina dorsally.

Gastro-orbital carina Short longitudinal ridge extending (often curving) anterodorsally from the cervical sulcus toward the orbital region.

Hepatic carina Longitudinally or obliquely disposed ridge of variable length lying ventral to the hepatic spine.

Hepatic region Paired anterolateral areas on the carapace bounded posteriorly by the branchial region, mesially by the gastric region, and anteriorly by the antennal region.

Hepatic spine Lateral spine situated near the anterior margin of the hepatic region on the carapace.

[1]A number of the definitions included are taken from Chace and Hobbs 1969.

Hepatic sulcus Groove ventral to the hepatic region extending from near the anterior margin of the carapace posteriorly.

Ischium, pl. -chia Third segment from the proximal end of a typically 7-segmented appendage.

Lateral lobe One of the paired lateral parts, often folded, of the petasma.

Lateral plate One of the paired, adjacent flaps sometimes present on sternite XIV in females.

Longitudinal suture Fine longitudinal line extending posteriorly from just above the base of the antennal spine.

Mandible One of the heavily calcified jaws lying anterior to (beneath, in ventral view) the other mouth parts.

Maxilliped One of a pair of three sets of cephalothoracic appendages arising posterior to the primary mouthparts. The most prominent set, the third or outer maxillipeds, are slender elongate appendages resembling the pereopods.

Median lobe One of the paired dorsal parts, often folded, of the petasma.

Median protuberance Conspicuous elevation, sometimes platelike, arising from the posteromedian part of the penultimate (XIII) thoracic sternite.

Median sulcus Dorsomedian groove on the carapace.

Merus, pl. -i Fourth segment from the proximal end of a typically 7-segmented appendage.

Open thelycum Structures (protuberances, ridges, and depressions) on the posterior two thoracic sternites for the reception of the spermatophores in females lacking seminal receptacles.

Orbital margin Anterior border of the carapace, often contiguous to the eye.

Orbital region Paired areas on the carapace just posterior to the eyes.

Orbital spine Spine projecting from the ventral extremity of the orbital margin.

Orbito-antennal sulcus Longitudinal or oblique depression between the orbital margin and the hepatic spine.

Palm Portion of chela proximal to finger.

Parapenaeid spine Spine projecting from the distomesial margin of the first antennular article.

Pereopod One of the five posterior paired appendages or legs attached to the cephalothorax.

Petasma, pl. mata Male genital structure consisting of the much enlarged and coupled endopods of the first pair of pleopods. The presence or absence of a petasma, or in juveniles the position of the petasmal endopods (situated more distally in females than in males), is the easiest means of distinguishing between the sexes in penaeidean shrimps.

Phyllobranchiate gill One in which the branches are platelike, usually occurring in paired series.

Pleopod One of the biramous paired appendages typically arising from each of the first five abdominal segments. In the shrimps, they are primarily swimming organs.

Pleurobranchia, pl. -ae Branchia attached to the body wall (pleural membrane).

Pleuron, pl. -ra One of the lateral flaps on each of the first five abdominal segments.

Podobranchia, pl. -ae Branchia borne on the basal segment (coxa) of a thoracic appendage.

Podomere Any one of the segments of an appendage, such as a segment (also article) of a pereopod or maxilliped.

Posterior process Posterior part of an elongate median protuberance projecting onto the last (XIV) thoracic sternite.

Posterior protuberance Conspicuous elevation arising from the posteromedian part of the last (XIV) thoracic sternite.

Postorbital spine Spine situated near the orbital margin posterodorsal to the antennal spine.

Postrostral carina Dorsomedian ridge extending from the base of the rostrum posteriorly, sometimes nearly reaching the posterior margin of the carapace.

Propodus, pl. -di Sixth or penultimate segment of a typically 7-segmented appendage.

Prosartema Narrow scalelike process arising from the mesial base of the first antennular article.

Pterygostomian spine Marginal spine arising from the anteroventral angle of the carapace.

Rostrum, pl. -tra Anteromedian projection of the carapace between the eyes.

Scaphocerite (antennal scale) Laterally rigid lamellate exopod of the antenna.

Seminal receptacle Invagination(s) of the integument of the fourteenth segment of females for the storage of sperm after copulation.

Somite Body segment.

Sternite Ventral part of a thoracic or abdominal segment.

Sternum Ventral surface of the cephalothorax or abdomen.

Stylocerite Pointed scale arising from the lateral base of the first article of the antennular penduncle.

Submarginal carina Longitudinal ridge adjacent, or somewhat dorsal, to the ventral margin of the branchiostegite.

Suprahepatic spine Spine arising from the posterior border of the cervical carina dorsal to the hepatic spine.

Taxon, pl. -a Any taxonomic unit such as an order, family, genus, or species.

Telson Terminal unit of the abdomen bearing the anus.

Tergum, pl. -a Arched dorsal portion of each of the first five abdominal segments or somites.

Thelycum, pl. -ca Genital modifications of the two posterior thoracic sternites in females including protuberances, ridges, depressions, plates surrounding or leading to the gonopores, or shielding the seminal receptacle(s).

Transverse suture Fine short vertical line extending dorsally from the ventral margin of the carapace.

Trichobranchiate gill One in which the branches are fingerlike and project from a central axis.

Uropod Paired biramous appendage attached to the sixth abdominal somite usually combining with the telson to form a tail fan.

Ventral costa Ridge extending along the ventromesial margin of the ventrolateral lobule of the petasma.

Ventrolateral lobule Ventral part of the lateral lobe of the petasma.

Ventromedian lobule Lateral part of the median lobe of the petasma.

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